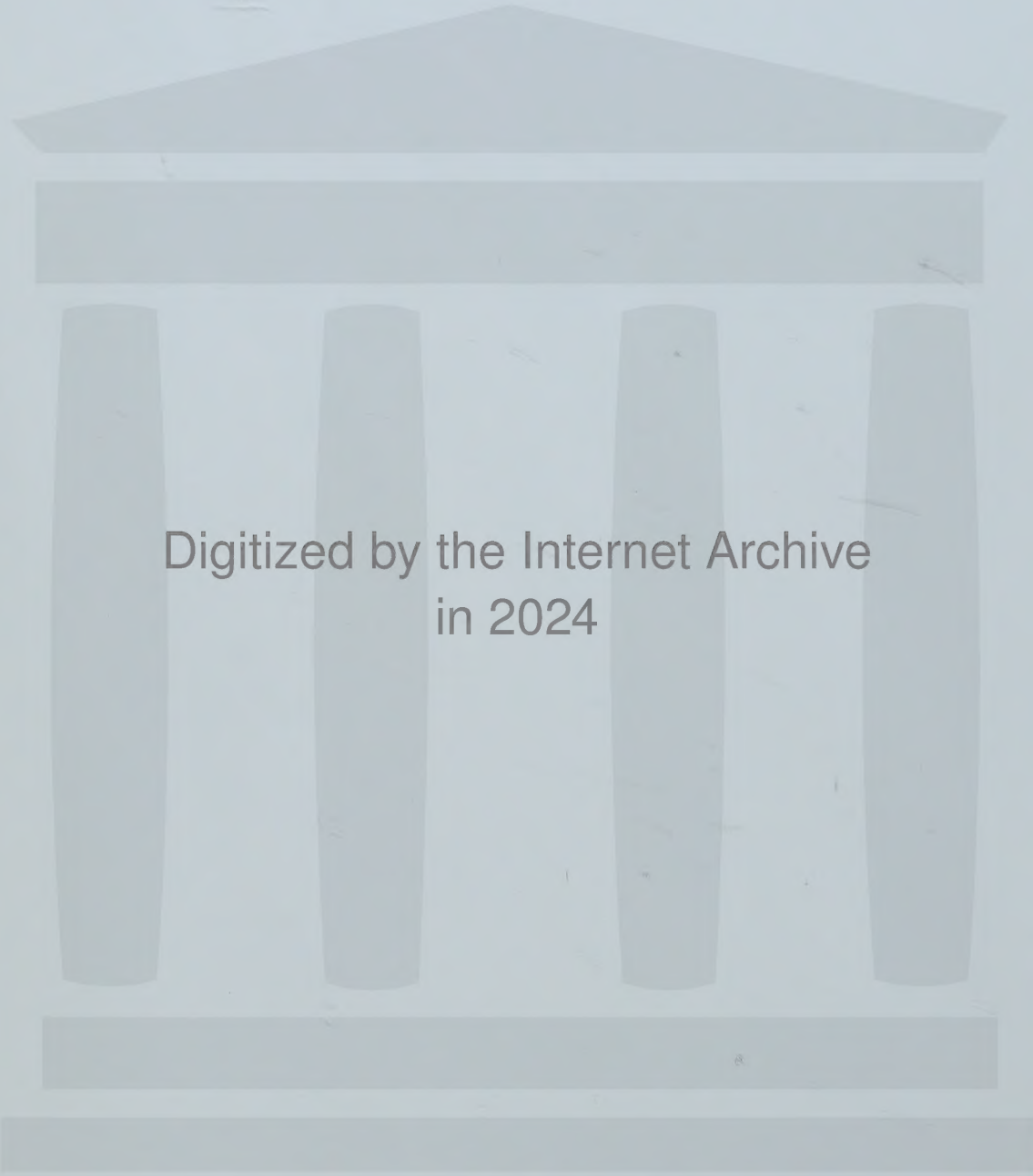




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52D CONGRESS, }
1st Session. }

SENATE.

{ Ex. Doc.
{ No. 157.

CERTAIN CLIMATIC FEATURES

OF THE

TWO DAKOTAS,

ILLUSTRATED WITH ONE HUNDRED AND SIXTY-THREE
TABLES, CHARTS, AND DIAGRAMS.

BY

JOHN P. FINLEY,

FIRST LIEUTENANT, NINTH U. S. INFANTRY.

FEBRUARY 26, 1892.—Read twice and referred to the Committee on Printing.

WASHINGTON:
GOVERNMENT PRINTING OFFICE,
1893,

[CONCURRENT RESOLUTION.]

Resolved by the Senate (the House of Representatives concurring therein), That 5,000 copies, comprising the necessary text, tables, and charts, be printed of the paper entitled "Certain Climatic Features of the two Dakotas," being a presentation of special information collected by the Weather Bureau for a long series of years as to temperature, rainfall, winds, barometric pressures, evaporation, and atmospheric disturbances, which are believed to have marked influence upon agricultural interests in the said States.

SEC. 2. That 1,000 copies be for the use of the Senate, 2,000 copies for the use of the House of Representatives, and 2,000 copies to be distributed by the Weather Bureau.

LETTERS OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D. C., April 16, 1892.

SIR: I have the honor to transmit herewith a paper entitled "Certain Climatic Features of the Two Dakotas," called for by joint resolution introduced by Mr. Pettigrew in the Senate February 26, 1892.

Very respectfully, your obedient servant,

EDWIN WILLITS,
Acting Secretary.

The PRESIDENT OF THE SENATE.

U. S. DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU,
Washington, D. C., April 12, 1892.

SIR: I have the honor to transmit herewith the report of Lieut. John P. Finley on "Certain Climatic Features of the two Dakotas," the printing of which was authorized by concurrent resolution of Congress February 26, 1892.

Very respectfully,

MARK W. HARRINGTON,
Chief.

Hon. EDWIN WILLITS,
Acting Secretary.

U. S. DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU,
Washington, D. C., April 5, 1892.

SIR: In accordance with your verbal instructions I have the honor to transmit herewith the manuscript of a brief special report on the climatology of the Dakotas, the publication of which is provided for by a joint resolution of the Fifty-second Congress. In the time given me for the preparation of this report I have attempted to accomplish the work with as much care and thoroughness as circumstances would permit.

Very respectfully, your obedient servant,

JNO. P. FINLEY,
First Lieutenant, Ninth U. S. Infantry.

Prof. M. W. HARRINGTON,
Chief of Weather Bureau, Washington, D. C.

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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

By JOHN P. FINLEY, *First Lieutenant, Ninth U. S. Infantry.*

INTRODUCTION.

In the preparation of this monograph exhaustive investigation and discussion are not attempted, although an effort has been made, within the time at the disposal of the writer, to examine all information immediately available at the central office of the Weather Bureau. The analysis of the data has largely been made with the view of throwing some light upon the fundamental causes of the occurrence of drought on the Northern Plains.

The subject is an important one and worthy of prolonged study. In the preparation of a more extended report, methods of observation should be carefully examined, results made comparable with greater precision, and due weight given to all variations from an accepted standard of comparison and verification. The data have been selected, arranged, and analyzed to broadly cover the field of investigation, and suggest lines of comparative study and research to those who may desire to pursue the subject specially, in certain directions.

Methods of treatment are explained and all the data employed in analysis and discussion are given in some one of three forms, viz: tabulations, diagrams, and charts. The opportunity is thus afforded to any student of making other, more varied, and more exhaustive applications of the fundamental values, as circumstances may suggest. A more complete analysis of the data would have been interesting and valuable, especially abnormal peculiarities in precipitation, temperature, and barometric pressure, on which some of the most important climatic features depend. However, the work submitted in this direction will, it is hoped, offer the means of extending research in various lines of climatic investigation with profit.

In the preparation of the base for all temperature and precipitation charts employed, only such places appear as have been stations of observation for a month or more, from 1857 to 1891, inclusive. Therefore every station upon the maps has some meteorological value attached to it, the data from which appear in the tables wherever a satisfactory monthly value could be obtained. In a few cases such values could not be secured, and consequently the tabulated list of stations will not exactly coincide with the face of the charts. The base map is of particular value in showing the distribution of points of observation over the territory under investigation, and to this extent marking the weight to be given to certain sections as compared with the whole area. While South Dakota has the greatest number of stations, their distribution is not altogether as satisfactory as over North Dakota. The construction of two lines of railroads entirely across North Dakota, from west to east, one over the southern and the other over the northern portion of the State, has proved of great benefit in the establishment of weather reporting stations.

In South Dakota the lines of railway communication are confined to that portion of the State east of the Missouri, except a short line running into the Black Hills from northwestern Nebraska. The Sioux Indian Reservation has for many years interfered with the development of South Dakota west of the Missouri, but the barrier is being gradually removed, and projected lines of communication will, before long, open up a vast country the climatology of which is as yet practically unknown. If railroads are the pioneers of civilization and material prosperity, they are certainly the means of acquiring those benefits in no small degree, through the opportunities afforded for

the establishment of reliable meteorological statistics, upon which to construct climatological values of the utmost importance to agricultural and commercial interests.

On the whole, this monograph will present to the public the most complete, comprehensive, and accurate collection of meteorological and climatological data ever published for the Dakotas. In this connection it is important to note that the records include the year 1891, thus securing a large amount of additional information, the accomplishment of which has entailed much labor. Data are furnished from stations in the region adjacent to and immediately surrounding the Dakotas, and comparisons are made with records from selected stations at more distant points, in order that differences in climatic effect may be instructively observed. Certain agricultural values are also presented in tabular form from careful computations made by Mr. J. R. Dodge, the Statistician of the Department of Agriculture. These records offer means of useful comparison with climatological data.

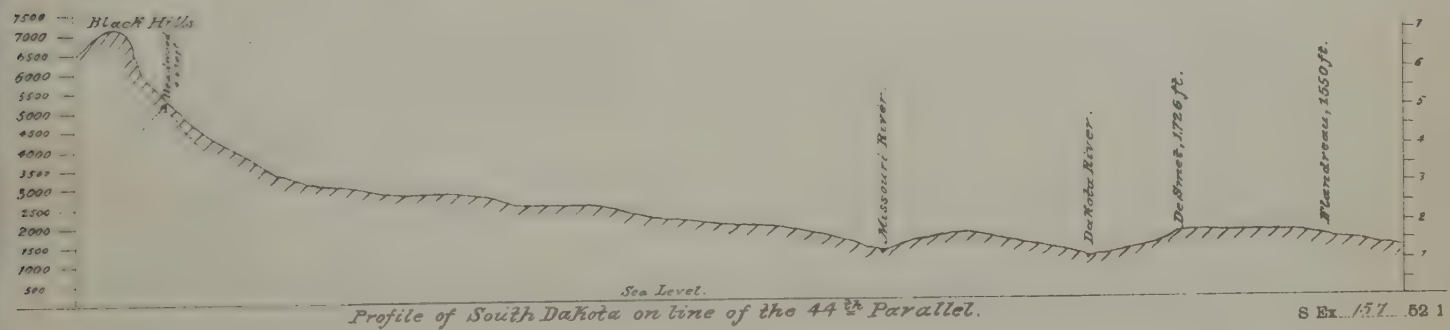
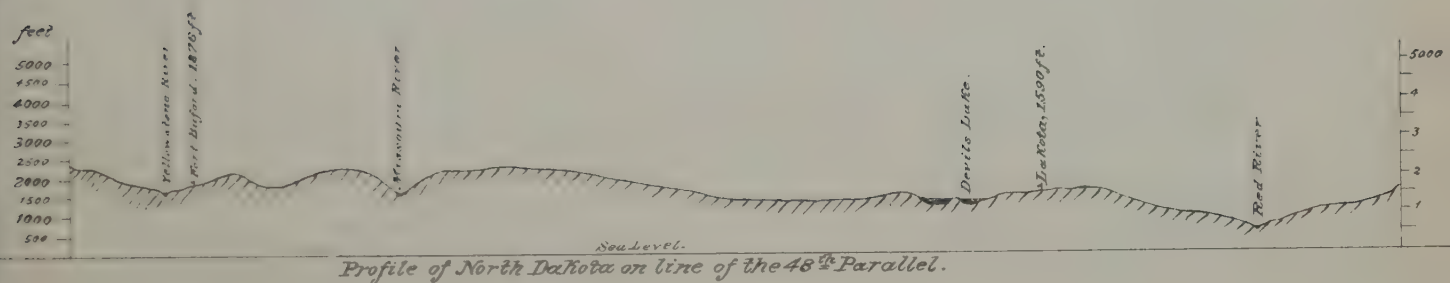
The scope of the data collected in this report will afford opportunity for valuable study in connection with the subject of irrigation, and in other directions, which in the brief discussion submitted can not receive more than a passing notice. It is intended that the value of this monograph shall rest upon an accurate presentation of all available records, and also upon a truthful and somewhat extended analysis of the data. The methods of examination and classification are believed to be simple and practical, and it is expected that the information furnished will be within reach of the agricultural and commercial classes. The actual records are submitted, generally in detail and at their face value. If the method of treatment in any case does not appear to meet the expectations or fancy of the casual reader, or the careful student, the opportunity is afforded of applying his own ideas to the original values. In the discussion, effort is made to avoid masking the truth by any tendency toward exaggeration or concealment.

Elaborate and involved methods of reasoning are not resorted to in support of preconceived or doubtful theories. Deductions are given in brief form and reference is made to the source of information with directness. Unfair comparisons have not been designed and undue advantage is not purposely given to any one section over another. Under such circumstances no unjustifiable expectations can be aroused in the interest of any agricultural or commercial developments. Endeavor has been made to present the actual records and all that pertains to them in such a manner that each section of the two States represented will stand on its own resources and be judged accordingly. Indications will be set against certain records, but the reader will be able to measure the accuracy and usefulness of the application.

PHYSICAL FEATURES.

The region under discussion in this report embraces over 150,000 square miles, an area about five times as great as the whole of New England. Its northern limit is 49° north latitude, which parallel forms the boundary between the United States and the Dominion of Canada west of the ninety-fifth meridian. Its southern limit is marked by the forty-third parallel of north latitude and its eastern and western limits by the meridians of $96^{\circ} 20'$ and 104° west from Greenwich. Its extreme length from north to south is about 430 miles and the width from east to west is about 350 miles. The entire region is divided into two irregular portions by the course of the Missouri, from northwest to southeast, and much the larger part of the two States is drained by this great river, which has a length within their boundaries of about 1,300 miles, when its tortuous course is entirely considered. The Red River of the North forms the dividing line between North Dakota and Minnesota and has a very devious course of about 600 miles before entering into Lake Winnipeg, Manitoba. The valley of this river embraces an area of about 23,000 square miles, about 8,000 of which are in North Dakota. The soil of this valley is very fertile and is said to make the "finest wheat land in the world."

The river systems of the Dakotas are very extensive and of considerable value to the agricultural and commercial interests of the States. Within the valley of the James, or Dakota River, the greatest artesian wells in the world have been found, the possibilities of which for the purposes of irrigation are enormous. The extraordinary supply of motive power along the rapid descent of the Big Sioux River furnishes opportunities for manufacturing and other industries of great commercial value. The two Dakotas are estimated to have a water surface of about 1,500 square



miles (about one one-hundredth of the entire territory), considering the rivers and the large number of small lakes, the latter being practically confined to the country east of the Missouri and predominating in South Dakota. The largest, Devils Lake, about 400 square miles, lies in north-east North Dakota.

The general contour of the whole territory is a vast undulating plain, sloping gradually from west to east. The accompanying profile sketch shows approximately the characteristic contour features of the two States.

There are two mountain regions in the territory, one in north-central North Dakota, called the Turtle Mountain, covering an area of about 800 square miles and having an altitude varying from 1,000 to about 1,500 feet above sea level. The other region, known as the Black Hills, lies in southeast South Dakota, and embraces an area of about 3,500 square miles, with an elevation varying from 3,000 to nearly 10,000 feet above sea level. In northeast South Dakota is an elevated plateau or range of hills, known as Coteau des Prairies, which reach a maximum elevation of about 2,000 feet above sea level. A similar range, but of larger extent, called the Coteau du Missouri, extends along the river of that name, the banks of which, near the central portion of the territory, are about 1,500 feet above sea level. In some places these hills have a width of 45 miles and their general trend is from northwest to southeast, for a distance of several hundred miles.

They form very nearly the western limit of the area adapted to agricultural purposes in both States, though the opportunity afforded for grazing has a considerably greater limit to the westward. In the report of the United States Northern Boundary Commission, Capt. Twining states that:

The surface of the Coteau consists of an irregular collection of pointed hillocks, growing more and more irregular in design and contour until they are merged in the Bad Lands. These Bad Lands, or "*mauvaises terres*," as they are termed by the half-breeds, set at defiance all rules of topography, as well as all adequate description. Lacking even the continuous lines of drainage on which the eye may rest and which give form and system to an ordinary terrain, they stretch in an endless and tiresome succession of arid and treeless hills and ridges, a tumultuous expanse of baked mud.

The surface of the whole territory is greatly varied, but, with the exception of the Black Hills, an outlying range of the Rocky Mountains, there are no important summits in the two Dakotas. A very considerable portion of the country is composed of irregular plateaus of moderate elevation, scattered over which are numerous isolated buttes (peaks) having an elevation above the plains of from 500 to 1,500 feet.

The topographical and geological surveys of the Dakotas are yet far too incomplete to furnish data upon which to base more than a very general and rather imperfect description of their physical characteristics. It is evident from the limited information now obtainable that marked local peculiarities abound in spite of what appears to be a general sameness of surface. Under such circumstances corresponding vagaries of climatic condition may be expected which can only be satisfactorily known by the most extensive and thorough system of meteorological observations, and by an accurate hydrographic survey of the two States.

The only considerable areas of forest are to be found in the two mountain regions above described. In the Black Hills there is estimated to be about 1,500 square miles of wooded area. Along the river bottoms and about the lakes are occasionally heavy growths of timber. The U. S. Geological Survey in 1889 estimated the approximate area, in square miles, of timber land in North Dakota (river bottoms) as 200; in South Dakota, 2,800 square miles, only 400 of which embraced merchantable timber. The cultivation of forest trees began in both Dakotas in 1884, in accordance with the observance of Arbor Day, and very satisfactory results have followed this enterprise.

METEOROLOGICAL RECORDS.

Meteorological observations in the Dakotas do not cover the vast area in a satisfactory manner, but this statement need not create surprise if the undeveloped condition of the country is fully realized and its peculiarities of topography are understood. Most of the work accomplished has naturally been confined to the territory east of the Missouri and principally in South Dakota.

It is progressing quite rapidly with the march of civilization westward and the opening of new lines of railway communication.

To the Medical Department of the Army must be accorded the credit of being the meteorological pioneers throughout the region of the great Northwest. The medical officers, at the various military posts established in the Dakotas, began observations of temperature, rainfall, wind direction, and state of weather in 1854, the first station being opened at Fort Pierre, S. Dak., in January of that year. The next post was at Fort Randall, S. Dak., the observations beginning in November, 1856. At other posts meteorological records began as follows: Fort Abercrombie, N. Dak., February, 1859; Yankton Indian Agency, S. Dak., November, 1859; Fort Berthold and Fort Buford, N. Dak., September, 1866; Fort Stevenson, N. Dak., August, 1867; Fort Totten, N. Dak., August, 1869. This distribution of stations of observation excluded southwest Dakota, where meteorological records did not commence until 1878, by the establishment of a Signal Service station at Deadwood in January of that year, followed in July, 1879, by observations at Fort Meade, in the Black Hills, a short distance east of Deadwood. Altogether seven stations have been established in the Black Hills for various periods of time since January, 1878, four of which are now in operation.

Following the initiatory work of the Medical Department of the Army came that of the voluntary observer, through the instrumentality of the Smithsonian Institution. The first station so established was at Yankton, S. Dak., in January, 1860; the next at Mouth Cherry, S. Dak., April, 1861. Other early stations opened as follows: Bon Homme, S. Dak., March, 1872; Fargo, N. Dak., December, 1872; Morrilton, S. Dak., February, 1875; Webster, S. Dak., June, 1882; Richardton, N. Dak., February, 1884. Voluntary observers began their work at places convenient to established lines of communication, but yet they were well advanced to the outposts of civilization, and their work manifests a very creditable appreciation of the practical value of climatological data.

The Signal Service Bureau was established by Congress in the early part of 1870 and in November of that year a number of regular stations of observation were opened. This Bureau entered Dakota in 1872, establishing its first station at Fort Sully, S. Dak., on May 7 of that year. The next at Pembina, N. Dak., November 1, 1872; Yankton, S. Dak., April 1, 1873; Bismarck, N. Dak., September, 15, 1874; Fort Buford, N. Dak., February, 1879.

From January, 1854, to December, 1891, meteorological observations have been taken at 50 stations in North Dakota and 75 stations in South Dakota, a total of 125 stations in both States.

The length of records at these stations has varied from a month at a few points to 10 years at Fort Yates and Fort Rice, N. Dak., and at Deadwood and Webster, S. Dak.; about 11 years at Huron, S. Dak.; 13 years at Fort Meade, S. Dak.; 15 years at Fort Stevenson, N. Dak.; 17 years at Bismarck and Fort Abercrombie, N. Dak.; 18 years at Fort Abraham Lincoln, N. Dak.; 19 years at Yankton, S. Dak.; 20 years at Fort Sisseton, S. Dak., and Fort Pembina, N. Dak.; 21 years at Fort Totten, N. Dak.; 23 years at Fort Sully, S. Dak.; 26 years at Fort Buford, N. Dak.; and 35 years at Fort Randall, S. Dak. It will be seen that the average period over which observations have been taken is very nearly the same in both States, being about 18 years in North Dakota and about 19 years in South Dakota. The maximum record of 35 years occurs in extreme southeastern South Dakota. The next highest, 26 years, occurs in extreme northwestern North Dakota—a rather singular comparison between the two States.

The hours of observation have been most varied at Signal Service stations. From November 1, 1870, to December 31, 1884, observations were made at the following hours daily, Washington time: 7, 7:35, and 11 a. m.; 12 noon; 3, 3:35, 4:35, 7, 11, and 11:35 p. m. On January 1, 1885, time was changed to the seventy-fifth meridian, eight minutes faster than Washington time. From that date to June 30, 1888, the hours of observation were 7 and 11 a. m.; 3, 7, 10, and 11 p. m. On July 1, 1888, the hours were changed and reduced to 8 a. m. and 8 p. m. Those now mentioned formed the telegraphic series of observations. Observations at local time were taken at 7 a. m., 2 and 9 p. m., from November 1, 1870, to July 1, 1881.

At voluntary stations the observations of temperature, wind direction, wind force (estimated), and cloudiness have been generally taken at 7 a. m., 2 and 9 p. m., local time. At some stations

the hours were shortened to two of the same name, usually 8 a. m. and 8 p. m., or 9 a. m. and 9 p. m. The amount of precipitation was observed once daily, unless abnormally heavy, at the most convenient hour.

At military posts the hours of observation were changed from 7 a. m., 2 and 9 p. m., in the autumn of 1888, to 8 a. m. and 8 p. m., or to any two hours of the same name from 7 a. m. to 9 a. m., inclusive. At both voluntary and at military-post hospital stations observations have always been taken at local time. The mean temperature from three observations has been determined by taking one-fourth of the sum of the 7 a. m., 2 p. m., and twice the 9 p. m. The mean from two observations of the same name has been obtained by taking one-half of their sum. These rules apply to the local and two-hour observations of the same name at Signal Service and Weather Bureau stations.

The means of pressure, temperature, humidity, and dew-point, computed from the synchronous tridaily telegraphic observations, taken at Signal Service stations, at 7:35 a. m., 4:35 and 11:35 p. m., or 7 a. m., 3 and 11 p. m., or 7 a. m., 3 and 10 p. m., have been obtained by taking one-third of the sum of the three observations. Precipitation was measured three times daily from November 1, 1870, to June 30, 1888, and thereafter twice daily at the telegraphic observations. At Canadian stations the hours of observation have been the same, with corresponding changes, as the tri-daily and twice-daily telegraphic observations at Signal Service and Weather Bureau stations.

From what has preceded it will be seen that the records of temperature and precipitation given in Appendices Nos. 4 and 40 combine the work of three classes of observers, the most accurate and systematic of which have been those of the Signal Service and Weather Bureau. The observations vary, not only as to character of work performed, but as to methods pursued and as to quality of instruments employed. Such results have been combined in monthly and annual averages at those stations where it was necessary to do so in order to secure a continuous record of the maximum period for which observations had been taken. This method gives less satisfactory results for precipitation than for temperature. In order that comparison may be made with more uniform observations, and perhaps more accurate and acceptable computations, in the case of temperature, three sets of monthly and annual temperature normals for different periods, of eight, nine, and ten years each, prepared exclusively from Signal Service and Weather Bureau observations, are furnished in Appendices Nos. 42, 43, and 44. The results from combined records are expected to vary, because of different causes, there being present in the determinations varying hours of observation, different periods of time, quality of work, and quality and kind of instruments employed. From a cursory examination it would seem that the longest record gives, generally, the best result in spite of the want of uniform methods of work. Comparison made with the standard normal values shows the pronounced effect from warm and cold periods, of few years' duration, or even one season, as occurred in the abnormally warm winter in 1891.

In the case of precipitation two sources of error appear in the records from voluntary observers and military-post hospitals, but greater in the former than in the latter, viz: (1) imperfect measurement of snowfall and its reduction to rain; (2) defective apparatus for the measurement of rainfall and want of care in measuring and recording the amount collected in the gauge. The Signal Service and Weather Bureau records are more uniform and more accurate in these respects than those obtained from other sources. The degree of this accuracy can only be spoken of in a general way and will doubtless vary with every station, being more at some and less at others. But, aside from such a result, it must be conceded that the influence of locality and topography demand the most careful consideration in applying any correction for supposed erroneous methods of work in the measurement of precipitation. It is well known that the distribution of rainfall is subject to many and sometimes seemingly inexplicable variations, due to the conditions of exposure of the collecting apparatus and to the peculiarities of local topography. This fact being conceded, it becomes necessary to increase the number of stations of observation, as far as possible, and accept all records, even though each and every one can not be subjected to the same standard of criticism. In spite of the fact that other things may not be equal, the longer the record of precipitation the more satisfactory the monthly and average values become. In the case of isolated records showing abnormal variations the data must become of considerable value.

In accordance with these views the precipitation records in Appendix No. 4 have been combined from all sources at each station, in order to secure the maximum continuity of observations. The precipitations and temperature records in Appendices Nos. 4 and 40 have been employed as the basis of construction of all charts of these elements, also diagrams, and in the preparation of supplemental tables in extending the analysis of meteorological data.

PRECIPITATION.

An accurate knowledge of the rainfall of any considerable region of country is indispensable to a satisfactory estimate of its productiveness. The fundamental source of material prosperity and commercial supremacy in any country lies in the products of the soil, the development of which depends upon the amount and distribution of atmospheric precipitation, direct, or through the instrumentality of irrigation. It is the most important element for discussion in this monograph, aside from evaporation, and also the most difficult for thorough treatment. The immense area embraced by the Dakotas, the limited number of stations of observation, and the lack of uniform and continuous methods of work at all places render the data submitted inadequate for a satisfactory representation of the rainfall, especially west of the Missouri River.

Precipitation has received consideration in the preparation of twenty-nine charts, forty-two diagrams, and nineteen tabulations, published in this monograph. The fundamental data for classification and analytical study have been obtained from the records published in Appendix No. 4. The cartographical representation of the monthly and annual average values has been prepared without the usual employment of isometric lines. The thirteen charts here referred to will be found in Appendices Nos. 27 to 39, inclusive. Recourse has been had to this rather novel and perhaps doubtful method of representation because of the rather remarkable differences in isohyetal values, the small number of stations from which normal values could be obtained, and the large scale of the charts. It is believed, however, that the plan adopted will better serve to convey the truth than the employment of uncertain methods, of perhaps more graphic illustration. The values for each station are entered in very large figures, to aid the eye in locating them quickly and in making comparisons with surrounding stations. Peculiarities are thus prominently set forth, and with a degree of accuracy that prohibits criticism and prevents an unfair distribution of theoretical curves. Isolated stations are not neglected, and large areas are not given a shading of supposititious value. By the methods pursued due weight is given to stations of long and short records and consideration had for the influence of local topography. The charts have entered upon them monthly and annual values of from three to thirty-five years, and in the extremes, on the average, from five to seventeen years, obtained from a total of forty stations. The agreement between the longest records is, on the whole, better than between the long and short ones, as might be expected; yet this disagreement is much less marked from April to September, inclusive, than during the remainder of the year, from October to March, inclusive.

The hyetography of the Dakotas presents peculiar features of local divergence that seem inexplicable from topographical influences alone. From a general view of the face of the country one would expect to find a remarkable uniformity of precipitation expressed in the monthly average values of three years or more, and especially in the annual values. While the precipitation records are a little more complete and of somewhat greater length than those of mean temperature, yet the corresponding increase in value is extremely small because of the much greater length required for precipitation records in order to secure satisfactory normal values. The advisability of charting three-year records of rainfall may be questioned; yet those of ten years and over, aggregating twenty stations, were not sufficient in number, when properly distributed, to cover the territory. Moreover, considerable differences were found among the long records, and in some cases they were greater than those found to exist between the long and short records, where reasonable comparison could be made. However, the averages show that the differences between the short records in North Dakota in the winter months (dry season) are about 65 per cent greater than those existing between the long records, the mean difference being about one-third of an inch. On the contrary, in South Dakota, the differences between the long records are about 10 per cent greater than between the short records, the mean difference being about one-tenth

of an inch. For the summer months (wet season) the average differences are about 45 per cent greater for the short records in North Dakota, the mean difference being about seven-tenths of an inch. In South Dakota the average differences for the short records are about 35 per cent greater, the mean difference being about four-tenths of an inch.

Considering the long records by themselves the average differences in South Dakota during the winter months (dry season) are about 70 per cent greater than exist in North Dakota, the mean difference being about four-tenths of an inch. During the summer months (wet season) the average differences in South Dakota are about 55 per cent greater than in North Dakota, the mean difference being about 1.2 inches.

Considering the short records in similar periods it is found that the average differences in South Dakota during the winter months (dry season) are about 35 per cent greater than those in North Dakota, the mean difference being about half an inch. In the summer months (dry season) the average differences in North Dakota are about 30 per cent greater than in South Dakota, the mean difference being about 1.3 inches.

From these comparisons it is evident that the short records show considerable uniformity although the observations were made for quite widely different years. It is important to state, however, that most of the short records are confined to the period between 1887 and 1891. There is also developed such a relation to the long records as to warrant the belief that the distribution of rainfall over the Dakotas is subject to rather marked local peculiarities, which can only be fully appreciated by largely extending the present system of rainfall observers. If the greater variations in rainfall in South Dakota, as disclosed by the records, are due in part to the greater number of stations and the larger area covered, it is simply additional evidence in support of the existence of decided local features. In this connection it is deemed advisable to invite particular attention to the records at Richardton, N. Dak., and Webster, S. Dak., the former covering a period of nearly five years and the latter about ten years. The precipitation at both stations appears excessive and much at variance with surrounding points. It was first assumed that errors were made in measuring and reducing the snowfall, but throughout the year the excess is maintained at both stations, although somewhat greater in winter than in summer. There has been no change in observers and both have reported to the Weather Bureau that their observations were properly made and recorded from standard instruments. These instruments were furnished to the observers by the Signal-Service Bureau. Peculiarities are also manifested in the records from Alexandria, Olivet, and Parkston, S. Dak., and also at Fort Seward, N. Dak. At the large majority of voluntary stations in both Dakotas standard Weather Bureau instruments have been employed, which fact seems to justify the expectation of fairly reliable observations, as the instruments so furnished carry with them specially prepared instructions as to their use.

Perhaps the most unsatisfactory work in rainfall observation arises from broken and incomplete records, seriously interfering with the determination of reliable monthly and annual normal values. The results met with in this respect have certainly been very unfortunate, and it is hoped that in succeeding years the great importance of accurate and complete precipitation records may be more fully appreciated by all classes of observers.

It is not to be assumed, however, that the rainfall records at Weather Bureau stations, whether long or short, give a correct knowledge of the distribution of precipitation over any region simply because of their greater accuracy. These regular stations are necessarily few in number in any State and are not always located to the best advantage for representing the distribution of rainfall. Moreover, their small number essentially prohibits such a result. The efforts of voluntary observers must be relied upon to support the work of the regular stations, which can never be considered more than a nucleus of standard value around which the former may be gathered for comparative study and the development of distinctive features. The records from regular stations are indispensable to the study and forecasting of daily weather changes because the daily observations are concentrated at suitable points for immediate consideration, through the aid of the electric telegraph.

A further study of charts and tables reveals some important features, as follows:

1. The month of least precipitation is November, followed next in order by January.
2. The month of greatest precipitation is June, followed next in order by May or July,

3. Precipitation increases from an average of about one-half inch in November to nearly 4 inches in June, the increase in South Dakota being about 5 per cent. greater than in North Dakota.

4. The mean annual precipitation in North Dakota varies from about 13 inches at Fort Buford to about 26 inches at Richardton and 20 inches at Fort Pembina; the average for the whole State, computed from 14 stations, being about 17 inches.

5. The mean annual precipitation in South Dakota varies from about 17 inches at Fort Sully to over 28 inches at Deadwood and over 38 inches at Webster; the average for the whole State, computed from 21 stations, being about 22 inches.

6. Aside from the rather doubtful record at Webster, S. Dak., the region of greatest precipitation, considering both States, is found in the Black Hills. This applies not only to the snowfall of winter, but to the rainfall of spring and summer. In this connection it is important to bear in mind that the Black Hills are the heaviest wooded region in either State.

7. The mean annual precipitation of the Red River Valley varies from about 15 inches at Fort Rice, N. Dak., to 23 inches at Winnipeg, Manitoba, and 24 inches at Moorhead, Minn.; the average computed from 6 long-record stations being about 20 inches.

8. The mean annual precipitation of extreme eastern South Dakota varies from about 16 inches at Brookings to about 22 inches at Fort Sisseton and 38 inches at Webster; the average being about 25 inches.

9. The mean annual precipitation of the James River Valley varies from 15 inches at Fort Seward, N. Dak., to about 26 inches at Olivet and Yankton and 27 inches at Morrilton, S. Dak. The average computed from 8 stations is about 22 inches, the portion in North Dakota giving an average of over 16 inches, while that in South Dakota rises to over 25 inches.

10. The mean annual precipitation of the Missouri River Valley varies from about 13 inches at Fort Buford to over 20 inches at Fort Randall, the average for the whole valley, computed from 9 stations, being 17 inches. The portion in North Dakota has an average of 16 inches and that in South Dakota over 18 inches.

11. The monthly and annual average precipitation from selected stations given in Appendix No. 6 furnishes interesting and valuable comparisons with surrounding territory, having both greater and less rainfall than occurs within the Dakotas. It is evident that the region of least rainfall between the forty-first and fifty-fifth parallels and west of the ninetieth meridian (annual average about 9 to 13 inches) lies in northern Wyoming and eastern Montana. The Dakotas lie to the eastward of this arid region and make the nearest approach to it in northwestern North Dakota.

12. In Appendix No. 7 will be found the monthly and annual amounts and averages of snowfall at certain stations in the Dakotas. The records are not altogether satisfactory, owing to the imperfect manner in which the measurements of unmelted snow have been made and the uncertainty in separating this element from rainfall. Prior to 1885, at Signal Service stations, the snowfall was not recorded separately and without reduction. The exceedingly small amount of snow is one of the most striking features of the tabulation and reveals one of the unfavorable points in the climatology of the Dakotas. The Black Hills show the largest amount of snowfall, as was also the case with rainfall. The records appear to show that the snowfall is heaviest in South Dakota and least in North Dakota. It is also generally heavy in the Red River Valley and in extreme eastern South Dakota. As to the months of heaviest fall the maximum is reached in February in North Dakota and in March in South Dakota.

13. Considering the distribution of snow over that portion of the United States and Canada where it usually falls, the Dakotas lie within the region of the minimum amount (annual average 1 to 2½ feet), which includes Wyoming and eastern Montana. The regions of maximum amount (annual average 10 to 30 feet) are the Sierra Nevada Mountains in northeastern California and the Province of Quebec in Canada.

14. The amount of unmelted snow on the ground at the end of month, as shown in Appendix No. 8, discloses the fact that the snowfall of the Dakotas disappears quite rapidly. But as the low temperatures of the snowfall season would preclude much melting it is perhaps fair to assume that the high winds of winter are largely responsible for the disappearance. Moreover, the vast plains in both States afford great advantage to the sweeping high winds in removing the snow.

The snowfall disappears most rapidly in the interior of both States, and least rapidly in the Black Hills and in the Red River Valley.

15. In Appendices Nos. 15 and 16 are tabulated the occurrences of excessive precipitation in both Dakotas. Monthly amounts equaling or exceeding 10 inches have occurred only twice in North Dakota and but eight times in South Dakota since 1871. The heaviest monthly rainfall in either State (14.65 inches) was reported from Webster, S. Dak., in June, 1884. The heaviest in North Dakota (10.93 inches) was reported from Fort Abraham Lincoln in June, 1890. The largest 24-hour rainfall in either State (8 inches) was reported from Morrilton, S. Dak., on July 22 and 23, 1878. The largest 24-hour rainfall in North Dakota (5.10 inches) was reported from Fort Totten, on August 25 and 26, 1880. The greatest rainfall in less than two hours in either State (4.84 inches) was reported from Webster, S. Dak., on July 2, 1884, as occurring in one hour and forty-five minutes. The greatest rainfall in less than two hours in North Dakota (4 inches) was reported from Steele on June 14, 1891, as occurring in one hour and twenty minutes. It is evident from these records that the Dakotas are not liable to severe loss from flood, although the contour of the country is such, in some localities, as to drain off both the extreme and also the average excessive precipitation with detriment to the land, and with liability to damage other property to a degree that deserves to be guarded against.

16. A fundamental consideration of any periodical distribution of precipitation in the Dakotas is impracticable without correlatively discussing the distribution of atmospheric pressure over these States and the immediately adjacent region. In order that this important relation may be appreciated as far as the purposes of this monograph will permit, a graphic presentation has been made by the preparation of monthly charts of areas of low barometric pressure (see Appendices Nos. 137 to 148, inclusive) and by the use of diagrams to show the comparative curves of monthly deviations from normal values (see Appendices No. 99 to 138, inclusive).

17. The charts of tracks of centers of low pressure show that the Dakotas lie in the path of all barometric depressions moving eastward over the country from the Pacific Ocean. The black lines represent the direction of progressive movement of the low centers by connecting the plotted points designating those centers, at certain times each twenty-four hours.

18. The distribution of precipitation over the continent between the fortieth and fifty-fifth parallels north latitude shows that the areas of low pressure drop the maximum amount of their moisture west of the one hundred and twentieth meridian, and that from there eastward the rainfall diminishes rapidly to a minimum between the one hundred and fifth and one hundred and tenth meridians, and thence increases again to a second maximum between the ninetieth and seventy-fifth meridians, but south of the fortieth parallel. The source of the first maximum is found in the moisture gathered by cyclonic circulation from the warm waters of the Japan current in the North Pacific. The source of the second maximum is obtained in a similar manner from the Gulf and Gulf Stream. The probable cause of the minimum average annual precipitation between the one hundred and fifth and one hundred and tenth meridians is found in the fact of the great distance of this district from the two regions of maximum moisture supply to the continent of North America, viz: the Japan current and the Gulf and Gulf stream.

19. The major portion of the Dakotas appears to lie too far west and north of the path of northward air movement and the moisture supply from the Gulf. The bulk of the supply, under the influence of cyclonic circulation, tending northward is deposited east of the one hundredth meridian and south of the forty-third parallel.

20. The low-pressure areas are nearly drained of their moisture at the very coast line on the Pacific, and during the remainder of the journey to the great continental valley of the Mississippi no source of moisture supply can be drawn upon, except the snow beds of the great mountain systems between the one hundred and twentieth and one hundredth meridians, which in any event could furnish but a limited and uncertain amount. In this connection it is well to state that a significant relation seems to exist between the snowfall of the most elevated mountain ranges and the rainfall of summer, over the Northern plains. A deficiency in snowfall appears to correspond with a deficiency in rainfall, and *vice versa*. In order to illustrate the importance of this matter from a practical standpoint typical charts of barometric pressure have been prepared to show the conditions under which a deficiency of snowfall occurs in the Rocky Mountain and Sierra Nevada

regions, and also in a similar manner to show the distribution of mean atmospheric pressure under which an excess of snowfall occurs over the same regions. These charts have been prepared from a consideration of all the monthly values of mean barometric pressure since 1872 as published by the Signal Service. The ideal character of the charts is explained on pages 17 and 18 with those submitted on the occurrence of variations in rainfall. An examination of the typical chart for deficiency of snowfall reveals the fact that the mountain regions west of the one hundred and second meridian are under the influence of a preponderance of cold, dry air of high density. Such a prevailing characteristic in the distribution of mean atmospheric pressure indicates that a majority of all low-pressure areas have been diverted away from the region under the control of this High, and that they will continue to be so diverted until a decided change occurs in the mean pressure. When the Lows are thus prevented from passing over the mountain regions in question the distribution of precipitation is, of course, very materially modified and reduced to a minimum. A notable example under this type chart is found in January, 1889, and reference to the deficiency in snowfall is made in the Monthly Weather Review as follows:

While in some portions of the country (viz, northern New York and the northern portion of the Upper Lake region) the monthly snowfalls have been heavy, and have probably equaled or exceeded the January average, as a whole the snowfalls of January, like those of the two preceding months, have been unusually small. There can be no doubt that the winter snowfall to the close of January over much of the country, particularly the central and southern portions, is the smallest that has occurred for a number of years.

In the following month (February, 1889) precipitation remained considerably below the normal in the Plateau and Pacific coast regions. In March, 1889, the Monthly Weather Review states as follows:

To the northward of the fortieth parallel the line indicating the snow limit over the western part of the country curves southeastward over the Plateau region of the Rocky Mountains, forming an elongated area, within which no snow was reported, extending from Washington and the northeastern part of Oregon to western Colorado.

It is well known that the summer of 1889 was a remarkably dry one in the Dakotas. By reference to Appendix No. 14 it will be seen that the total deficiency in precipitation over the Dakotas for 1889 was over 65 inches (about 7,500 tons of water to the acre) computed from the records of nineteen stations.

21. The following typical chart showing the conditions under which excess of snowfall occurs over the Rocky Mountain and Sierra Nevada regions discloses a distribution of mean monthly atmospheric pressure, directly opposite to that displayed on the typical chart for deficiency of snowfall. The conditions for excess of snowfall indicate that the areas of low barometric pressure from the Pacific ocean have passed eastward directly over the mountain regions, and that they will continue to do so until a decided change has been effected in the mean pressure over those regions. An important example under this head is found in February, 1891. The Monthly Weather Review for that month records the occurrence of unusual snowfalls in the southern and western portions of the United States. Snow fell as far south as Meridian, Miss., for the first time in three years. It reached a depth of 120 inches at Cisco, Cal., and 104 inches at Alta, Utah. An unusually heavy snowstorm prevailed in the middle Missouri Valley and the extreme Northwest, seriously interrupting railroad traffic and causing the death of large numbers of cattle on the ranges. Precipitation was in excess of the normal as follows: Northeast slope of the Rocky Mountains, 130 per cent; Northern plateau, 129 per cent; Middle plateau, 108 per cent; Southern plateau, 219 per cent; Middle Pacific coast, 250 per cent. In March, 1891, the Monthly Weather Review reports excess of precipitation as follows: Northeast slope of the Rocky Mountains, 270 per cent; Middle Eastern slope, 253 per cent; Middle plateau, 208 per cent; Southeast slope, 140 per cent. The summer of 1891 in the Dakotas was marked by a notable excess of precipitation. By reference to Appendix No. 14 it will be seen that the total excess, as computed from sixteen long-record stations, amounts to over 40 inches (about 4,600 tons of water to the acre). The reports of the U. S. Department of Agriculture show that the year 1891 was an extremely favorable one for crop production generally throughout the Dakotas, or at least for that portion of them east of the Missouri River.

It is believed that from a study of the distribution of mean atmospheric pressure depicted on these typical charts information can be obtained which will permit of some long-range forecasting as to the probable occurrence of excesses and deficiencies in precipitation over the Northern plains.

An Ideal Typical Chart of Average Monthly Barometric Pressure Indicative of Excess of Snowfall in the Rocky Mountain and Sierra Nevada Regions, 1 to 2 months. December to February inclusive.



An Ideal Typical Chart of Average Monthly Barometric Pressure Indicative of Deficiency of Snowfall in the Rocky Mountain and Sierra Nevada Regions, 1 to 2 months December to February inclusive.



22. An examination of storm-track charts of the Dakotas for a long series of years reveals monthly and annual fluctuations from the average path of easterly movement which bear important relation to the distribution of both precipitation and temperature. These deviations are only in two directions, viz, north and south. The former corresponds to warm, dry weather and the latter to cold, wet weather. Illustrations of these results are given in Appendices Nos. 21 to 26, inclusive, and in Nos. 58 to 61, inclusive.

23. The study of the storm-track charts in relation to the wet and dry seasons furnishes very interesting and valuable comparisons. The amount of precipitation over any area depends not so much upon the number of storm centers passing over it as upon the rate of progressive velocity of those centers. The number of low-pressure areas as shown in Appendix No. 143 is greatest during autumn and winter and least during spring and summer. The following monthly average progressive velocities, in miles per hour, of the centers of both low and high-pressure areas, computed from records for five years (1887 to 1891), show that the lowest velocities occur during the season of greatest precipitation.

Average velocity of lows.—January, 39; February, 37; March, 33; April, 33; May, 26; June, 25, July, 24; August, 27; September, 27; October, 29; November, 35; December, 39.

Average velocity of highs.—January, 25; February, 26; March, 25; April, 25; May, 21; June, 19; July, 18; August, 21; September, 21; October, 22; November, 25; December, 26.

This amounts to saying that the more slowly a storm center moves the more moisture it will deposit upon the earth if the supply remains practically constant. The distribution of mean atmospheric pressure over the interior of continents during the summer season is favorable to the sluggish movement of all large disturbances.

24. A comparison of the storm-track charts for the various months discloses a remarkable change in the curvature of the paths of low-pressure areas across the Dakotas. During the dry season the deviations from a direct east and west line are very small, showing rapid progressive movement. But in the wet season (April to August inclusive) convolutions become extremely frequent, so that the five-year chart record for the month of June (month of greatest rainfall) becomes a labyrinth of winding lines.

25. A further application of the relation of barometric pressure to the occurrence and distribution of precipitation is shown in the preparation of the following typical dry and wet weather charts. They are termed "ideal" because their composite structure is not the result of the reduction of actual mean values for a large number of months, but rather the reduction of isometric lines; the former method is preferable because more accurate, and would have been followed in this report but for the large amount of labor involved. It seems reasonable, however, to assume that the charts will be found suggestive in their present form, to a degree that may give practical results in long-range forecasting. If, for example, the mean barometric pressure for April or May should disclose a wet weather type, an excess of precipitation may reasonably be expected for the next month or two. Under favorable conditions for its existence it would appear to take that long for the type and its effect to disappear. An examination of the wet-weather type chart reveals the existence of a sort of barometric trough of low pressure embracing the Rocky Mountain region and extending from British America to Mexico. During the prevalence of such a distribution of mean atmospheric pressure the areas of low barometer from the Pacific are found to pass eastward over the Dakotas, and at a much lower latitude than in the event of a period of dry weather, the condition of the atmosphere as to moisture and density being most favorable to a prevailing southerly air movement. It is generally found that lows tend to move in the direction of greatest moisture and towards the region where the existing atmospheric circulation most readily conforms to the requirements of the passing storm center. In wet weather the lows trend southward but in dry weather their deviation from the average course is decidedly northward. An example of wet-weather deviation is shown in Appendices Nos. 25 and 26, where the total excess of precipitation as compared with normal values for many years, amounted to 82.87 inches (about 9,400 tons of water to the acre), computed from the records of fifteen stations.

26. The dry-weather type chart shows a disposition of mean atmospheric pressure north of the fortieth parallel which has been found to be decidedly unfavorable to the development of low-pressure areas. Such a condition of atmospheric pressure not only affects the latitude of the east-

erly movement of lows from the Pacific, but it tends to materially reduce the number of such disturbances and to increase their progressive velocity, all of which are agencies in the reduction of precipitation over the Dakotas. Examples of dry-weather periods are given in Appendices Nos. 21 to 24, inclusive. During one of these periods the deficiency of precipitation, as compared with normal values for many years, shows a total loss of 72.93 inches (about 8,300 tons of water to the acre) over the Dakotas, computed from the records of twenty stations. Another dry period shows a total deficiency of 50.95 inches (about 5,700 tons of water to the acre) computed from the records of fourteen stations.

27. If the employment of these typical charts can be depended upon, the foreknowledge to be obtained from their study is of such a character that, even when expressed with a moderate degree of certainty, and properly distributed to the public, will prove of considerable value to agricultural and commercial interests. The success or failure of the most valuable crops, fruits, vegetables, or cereals very often depends upon the occurrence of a few days of abnormal weather changes, and especially so at the critical period of growth. Accurately prepared composite type charts, for various sections of the country, subjected to revision in order to take advantage of every confirmatory occurrence, should be made the subject of careful study by the forecast officials of the Weather Bureau. The wet and dry weather type charts submitted relate especially to the wet season in the Dakotas. Similar types but not so strongly marked will exhibit the conditions which give rise to corresponding changes in precipitation during the remainder of the year. This explanation will apply to the type charts concerning snowfall and also temperature.

DROUGHT.

Liability to a marked deficiency in rainfall over any region is a matter of the utmost practical value to both agricultural and commercial interests. Damage from excess of precipitation is not so great and can be more easily provided against. The limits of agriculture and horticulture are determined by the dry season for any region. In discussing the distribution of precipitation over large areas of country Dr. Hellman has made known the fact that in Spain marked differences in social and agricultural conditions have appeared between sections where the rainfall is in excess and where it is deficient. The differences are of such a degree that they appear to control the character and mode of life of the inhabitants.

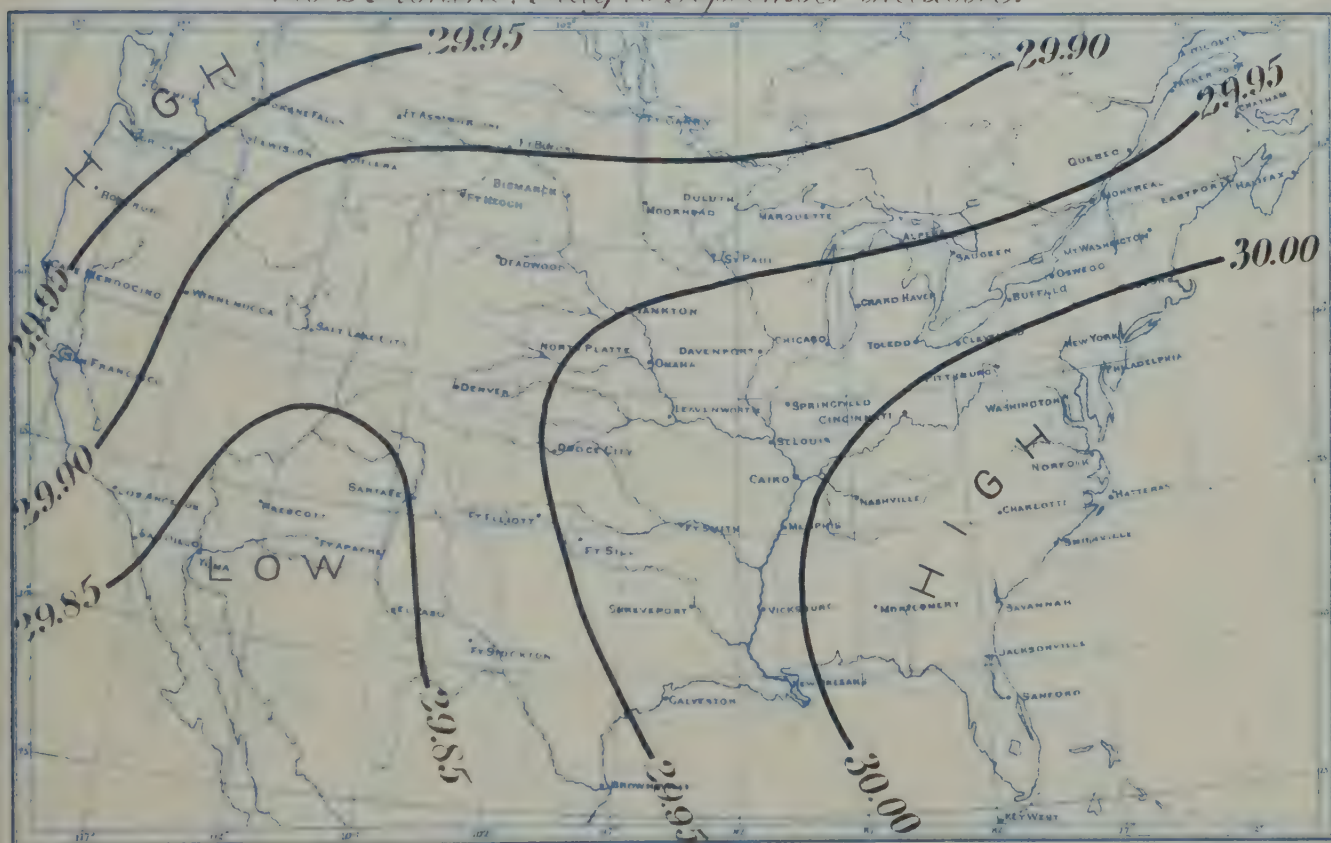
In the discussion of this question it is of the utmost importance to have exhaustive experiments and observations made to ascertain what degree of dryness the various food forms of plant life will submit to without destruction, and what amount of moisture will secure the best results in the full development of each variety. The scope of work to be assigned to the Agricultural Experiment Stations might profitably embrace investigation of this character. The field is a broad and rather difficult one for it includes the whole subject of atmospheric pressure, evaporation, and condensation, in which meteorology must have the coöperation of botany, chemistry, and geology to satisfactorily contend with the problems involved.

In the limited investigation made in this monograph research has been confined to such meteorological data as could be made most readily available from the records of the Weather Bureau. The method of treatment has been gradually developed by suggestions arising from a study of the fundamental data embraced in the tabulations, charts, and diagrams.

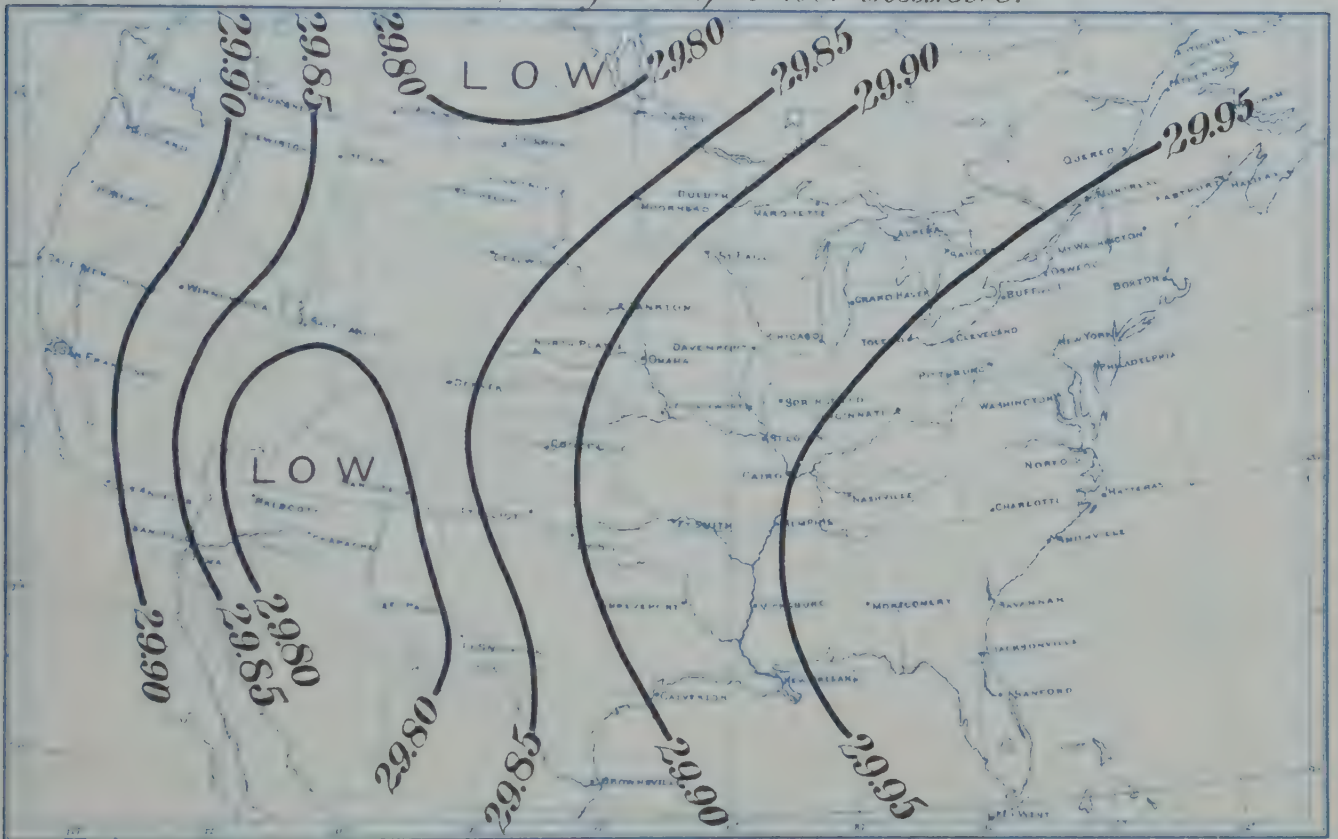
References to various authorities on climatic changes and the distribution of precipitation developed the fact that, as a meteorological condition, drought has apparently been considered only as a variation of the occurrence of rainfall, to such a degree as to injure vegetation. It would appear that drought, in the full meteorological sense of that term, has never been defined. In the *New Century Dictionary* the following definition appears: "Want of rain or of moisture; such a continuance of dry weather as injuriously affects vegetation." This is true as far as it goes, but the definition falls considerably short of completeness and does not touch the source of the essential atmospheric conditions involved in the occurrence of drought.

Drought as it has been studied in this report, and as the results of the investigation seem to show, has a closer relation to evaporation than to precipitation, and is more dependent upon the distribution of atmospheric pressure than upon the variation of any other meteorological element. Drought may therefore be briefly defined as that state of the weather over any region, within and

*An Ideal Typical Chart of Monthly Average Barometric Pressure
Indicative of Abnormally Dry Weather in the Dakotas for from
1 to 2 Months, May to September inclusive.*



*An Ideal Typical Chart of Monthly Average Barometric Pressure
Indicative of Abnormally Wet Weather in the Dakotas for from
1 to 2 Months, May to September inclusive.*



about which the distribution of atmospheric pressure is most favorable for the occurrence of the minimum amount of precipitation and the maximum degree of evaporation; a strong component being wind force, the result of which is to cause injury to both animal and plant life by the development of a high degree of aridity.

The actual precipitation of a district might be entirely adequate for its industrial needs were it not for the influence of abnormal evaporation. To discuss the nature and extent of this influence involves a consideration of all the elements which enter into the process of evaporation and which retard or accelerate it. Evaporation from land areas, both cultivated and uncultivated, as well as from bodies of water, is here referred to. The elements may be briefly enumerated as follows: Temperature of the air, force of the wind; direction of the wind, according to the humidity of the locality from whence it blows; atmospheric pressure, aridity of the air, degree of cloudiness, character and extent of vegetation, proximity and extent of forests, character of surface soil, temperature and humidity of soil, character of subsoil, area and depth of water forming the evaporating surface, radiation of surrounding bodies; dryness, stillness and density of the air over the evaporating surface.

Prof. Russell says that—

The amount of evaporation depends principally on the dryness of the air and the velocity of the wind blowing over the evaporating surface. The measure of the dryness of the air is the difference in vapor tension corresponding to the temperature of the air and that corresponding to the temperature of the dew point.

As to the values given in Appendix No. 83, Russell states that they only—

Represent possibilities of evaporation and not actual evaporation over the whole surface of the country. If a set of figures were prepared from the various parts of the country which would represent the opportunities of evaporation, which depend on the relative amount of land and water surface, and on the wetness or dryness of soil, and the amount and character of vegetation, the product of the two sets of figures would be the absolute evaporation.

Stelling determines evaporation from a combination of values which express the amount of vapor in the air corresponding to the temperature of the evaporating surface, the amount of vapor indicated by the dew point of the air at the time, and lastly the vapor tension for the existing wind velocity. To obtain the depth of evaporation by this method would involve the preparation of constants based upon careful computations from records for many years.

Maj. Powell says that—

Evaporation from standing bodies of water will vary from 56 to 82 inches per annum, depending upon exposure to winds and upon altitude. The higher the altitude the less the evaporation; the greater the exposure to wind the greater the evaporation. A large stream may come from the mountains of Colorado which may be lost before it reaches the Colorado-Kansas line, and no water whatever pass beyond that line. Out into the sands on either side the water may run for miles and is rapidly evaporated. What is not lost by evaporation disappears by infiltration.

In further testimony on this subject before the Senate Committee on Irrigation and Reclamation of Arid Lands, Powell says that—

From waters flowing from irrigated land about 30 per cent is evaporated. Growing plants evaporate 300 times their own weight of growth annually. Whatever the crop may be, whether corn, grass, or wheat, that grows in one year, it will evaporate 300 times its own weight of water. If, then, a crop is raised on a field which is irrigated, and a farmer is careless to such an extent that the field is covered not only with the corn or other crop he desires to raise, but also with a dense growth of weeds, the evaporation from that surface will be enormous. But if his field of corn is well cultivated, and if speedily after each irrigation he turns, with a harrow or raking tool, the ground between the rows, so as to have the ground mulched with a thin surface of soil, the evaporation is at a minimum.

Capt. Dutton, of the U. S. Geological Survey, says:

The extent of evaporation is always in proportion to the surface, other things being equal. We consider that evaporation depends on three quantities: The first is the temperature of the water; the second is the absolute humidity of the air. There is still a third, the rate at which the wind is blowing, the wind factor being really the most important and the most difficult to handle.

Tate established by careful experiments the following laws of evaporation in 1862: (1) Other things being the same the rate of evaporation is nearly proportional to the difference of the temperature indicated by the wet and dry bulb thermometers. (2) Other things being the same the augmentation of evaporation, due to air in motion, is nearly proportional to the velocity of the

wind. (3) Other things being the same the evaporation is nearly inversely proportional to the pressure of the atmosphere.

Observations show that one-third of the water falling in the Seine is taken by that river to the sea, the balance passing off by evaporation and percolation. A measure of the extent of evaporation over any region is indirectly given by the flowing waters of rivers and all other streams, which represent substantially the amount by which the precipitation exceeds the evaporation, less a small amount permanently lost by infiltration.

Irrigation will diminish the inflow to lakes, ponds, and rivers, but increase the active area of evaporation.

Clarence King found an observed evaporation of one-half inch per day in the Great Basin during the driest period of the year. Anstead gives the same rate of evaporation for the Red Sea during the summer.

Prof. Russell found the observed evaporation at Keeler, Cal., for the year ending June 30, 1888, to be 100.6 inches; Fort. Grant, Ariz., 101.2 inches; Yuma, Ariz., 95.7 inches, and Fort Davis, Tex., 96.4 inches. Bergland gives the annual evaporation at Cumana, Venezuela, as 130 inches, and the Dead Sea, 96. Moncrief reports the annual evaporation at Madrid as 65 inches, which corresponds very closely with the rate of evaporation in the California valleys.

The total precipitation of any region is carried away by evaporation, surface and underground drainage, and underground storage, and the only means of regaining it, except from the clouds, is by the development of an artesian supply and thus increase the total amount of water available for irrigation.

From what has already preceded we find that the relation of drought to evaporation is most intimate and important. So strong is the agency of evaporation in this respect that we might conceive of a region where the prevailing climatic conditions were such as to make the occurrence of drought entirely independent of rainfall. That is, no matter how great the precipitation, opportunities for evaporation would dispose of all the water on the surface not lost by infiltration. It can not be said that any portion of the United States (a region where the average annual rainfall varies from less than 2 inches to over 100) is absolutely free from the occurrence of such a deficiency in rainfall and such an excess of evaporation as to result in injury to vegetation and animal life. The same may be said of British India, where the average annual rainfall varies from about 10 inches to 500, but where the density of population is many times greater than in the United States.

Where the average annual rainfall is over 40 inches there are times when irrigation becomes necessary, especially under abnormal conditions of evaporation.

Moncrief, in his work on irrigation in southern Europe, cites cases of the employment of irrigation where the annual rainfall was about 40 inches. Similar cases may be found in the United States when systems of irrigation become better understood and more readily applied, and their advantages fully appreciated in the protection of crops. Where the annual rainfall equals or exceeds 40 inches the average cloudiness is sufficiently high to place a decided check upon evaporation, and therefore a large amount of moisture is saved to the soil and vegetation. By reference to Appendix No. 83 it will be seen that evaporation in the Dakotas is least in the Red River Valley and is greatest in the Missouri Valley. The values of average cloudiness given in Appendix No. 85 show that the largest region of high percentage embraces the Red River Valley and eastern South Dakota. Another very important point to be noted in this connection is the fact that the greatest average cloudiness in the Red River Valley and in eastern South Dakota occurs during the spring and autumn, when crops need most protection from evaporation and plenty of sunshine during the wet and growing season.

Many cases can be cited of remarkable evaporation under the influence of peculiar winds. Referring to the occasional "hot northers" of the California valleys, Abbot Kinney says:

Orchards planted along the edge of the Sierras, and also the cultivated area planted up to and during 1880, suffered a great deal from the hot, dry, desert winds. I have seen the bark of the trees and the fruit frequently excoriated by the sand carried by the wind, so that the tree and fruit gave the appearance of having been subjected, on the windward side to a sand blast. The hot desert winds have been undoubtedly lessened in force in our valleys, and so also have what we call trade winds.

The Chinook winds of the Northern Plateau and Saskatchewan Valley are attended with remarkable excesses of temperature and evaporation. During the prevalence of these winds, which occur most frequently in winter and spring, the thermograph records at weather bureau stations show almost a vertical ascent of the pen tracing to the extent of from 40° to 50° . Reports show that an increase of 70° to 80° in six to eight hours is not unusual. At Fort Assinaboine, Mont., during the prevalence of a remarkable Chinook wind on January 19, 1892, the thermograph record exhibited a rise in temperature of about 42° in fifteen minutes, and of about 49° in less than three hours. The Föhn of Switzerland is a hot, dry wind, peculiar to the mountains and valleys of that country, and during its prevalence remarkable rises in temperature take place, attended with an astonishing rate of evaporation. The southeast trade which descends the western slopes of the Andes from the pampas of Brazil, becomes such a dry wind over Peru that Prescott says the ancient Peruvians preserved their dead by exposing the bodies to its action. The northwest anti-trade of New Zealand becomes a hot, dry wind when it crosses the mountains, and its evaporating power is very great. The southeast trade on the African coast, and in Sicily, called the Sirocco, is attended with very high temperatures and causes great injury to vegetation by evaporation. Scott says that the Harmattan of the west coast of Africa is a hot, east wind, which coming off the desert brings with it clouds of reddish dust which cover the sails and decks of ships far out in the Atlantic. In Egypt the hot winds from the desert known as the Khamsin, or "fifty," from the idea that it blows for that number of days, causes much damage to vegetation by an excess of evaporation. The Zonda, the northeast trade of Argentine Republic, and called the Sirocco of South America, prevails during the months of July, August, and September, generally beginning about 8 a. m., and continuing until sundown, during which time "the heat is almost suffocating and the air is a cloud of dust," says Mr. E. L. Baker, United States consul, Buenos Ayres. The Zonda, however, is always followed by a south wind, which at once causes a sudden fall of the temperature, and reestablishes the atmospheric equilibrium.

M. Perez, United States consul, Cadiz, Spain, says:

An agent which considerably modifies the damp character of the climate of northern Spain is the peculiar south wind of that region. It acts like an enormous sponge to absorb the humidity, and as a natural stove where both the air and the soil are speedily dried up. The atmosphere acquires then such transparency that scarcely any gradual lines or shadows of varying distances on the horizon are perceived. It is peculiar to the south wind that immediately it ceases to blow it is generally followed with rain and that while it is blowing on the coast rain will most likely be falling on the elevated plateau of Old Castile. The winds which prevail longest in the year come from the west-northwest, succeeding the periods from the south.

The dry, hot southerly winds of the Dakotas, which we will call Hot Southerers, are attended with extreme heat and a high degree of evaporation, the extent of which has never been accurately measured. The destructive effect upon vegetation, however, is well known. The occurrence of the Hot Souther is mostly confined to late summer and autumn, except when abnormal deficiencies in precipitation occur earlier in the year. It is important to note, in connection with the occurrence of these high-power evaporating winds, that they result from peculiarities in the distribution of atmospheric pressure, modified to a certain extent by both general and local topography.

A marked deficiency in precipitation over the Dakotas in any month arises whenever the number of low-pressure areas become greatly reduced, or when the majority of them pass eastward north of the forty-eighth parallel. The latter condition operates most frequently as the determining cause, and thereby develops a preponderance of southerly winds attended with excessive dryness and high temperatures. Atmospheric circulation in low-pressure areas moves toward the place of least pressure, and *vice versa* in the case of high-pressure areas. The air drawn northward over the Dakotas in low-pressure areas starts with the moisture of the Gulf and adjacent regions to the north, but precipitates the vapor over the intervening country, getting rid of the water but retaining the heat and obtaining more of the latter as the currents progress northward over the hot plains of Kansas and Nebraska. In the case of high-pressure areas, when the lows pass eastward south of the forty-fifth parallel, they, the highs, start southward with the cold and dryness of the interior of British America and give the Dakotas the benefit of "first choice," the intensity of the disturbances becoming ameliorated as they progress to lower latitudes.

Under such distribution of atmospheric pressure the Dakotas are frequently subjected to extremes of cold, heat, and aridity, according to the latitude and velocity of the progressive movement of the disturbances. As these conditions of occurrence depend upon fundamental and general changes in the atmosphere over extended regions of country, and as it is generally accepted that permanent climatic changes are not taking place, it must be conceded that the prevailing characteristics of atmospheric pressure over the Dakotas, as shown by the records in this monograph will continue in the future as they have occurred in the past.

The conditions under which abnormal cold weather, warm weather, dry weather, and wet weather are developed in the Dakotas are shown in Appendices Nos. 21 to 26, inclusive, and in 58 to 61, inclusive.

As to protection from the deleterious influences of evaporation, Prof. Fernow says:

Summer and winter drought, viz, rapid evaporation, is the bane of the farmer on the plains, and this is due to the continuous dry winds, which can be checked by rationally disposed timber belts. Another merely mechanical influence which needs no argument or discussion with the observer of natural phenomena, is that which the forest cover on the mountain sides exerts in retarding the melting of the snow and the drainage of the water, thus prolonging the period during which the same may be made available. Complaints that the snows do not lie as long into the summer as they used to, before the forest cover was removed, may be heard all along the eastern Colorado slope, where irrigation has been practiced in the most rational manner and the water flow the best observed.

Absence of precipitation does not always mean drought, especially when the soil is moist and evaporation is retarded by cloudiness and unfavorable wind conditions. Therefore the maximum period without rainfall, as a measure of the intensity of the drought must be considered accordingly. In Appendix No. 82 are presented data from a long series of years expressing the drought period as measured by the total absence of rain, for the longest consecutive period, also by that absence plus the time during which there were but "traces" of precipitation, which could have little or no effect upon vegetation. A comparison of the records from North Dakota and South Dakota show that the former is subject to the longest average consecutive period without rain, about 23 days, the extremes varying from 22 days (September to May, inclusive, 1874, 1884, 1890) in the Red River Valley to 45 days (January and February, 1877) in the James River Valley, and 54 days (August to October, inclusive, 1883) in the southeastern portion of the Missouri Valley, to 59 days (January to March, inclusive, 1877) in the northwestern portion. In South Dakota the average consecutive period without rain is about 19 days, the extremes varying from 19 days (September to November, inclusive, 1885, 1891) in the Black Hills, to 31, days (October to December, inclusive, 1887, 1888) in the James River Valley, and 45 days (November to March, inclusive, 1864, 1887) in the Missouri Valley. Considering the greatest consecutive period without rain, including "traces," the average for North Dakota is about 32 days, the extremes varying from 29 days (November to January, inclusive, 1885, 1889, 1890) in the Red River Valley to 54 days (February and March, 1880) in the James River Valley, to 113 days (January to April, inclusive, 1880) in the Missouri Valley. In South Dakota the average period without rain, including "traces," is about 27 days, the extremes varying from 24 days (January, 1879) in the Black Hills, to 38 days (November and December, 1888) in the James River Valley, to 61 days (October to December, inclusive, 1864, 1875, 1880) in the southern portion of the Missouri Valley, and 67 days (February to April, inclusive, 1887) in the northern portion.

The maximum periods without rain are almost entirely confined to autumn, winter, and spring in both Dakotas, and appear to be most frequent from September to December, inclusive, during which latter period the average path of areas of low pressure (storm centers) is north of the forty-seventh parallel, as will be seen by a reference to Appendices Nos. 155 to 158, inclusive; another striking confirmation of the relation of precipitation and evaporation to the distribution of atmospheric pressure.

A further illustration of this important relation is shown diagrammatically in Appendices Nos. 99 to 138, inclusive, where both the actual and the reduced barometric pressure have been considered, to compare principally, the corresponding effects of the extremes of heat and cold, and the deficiencies and excesses of precipitation. The fluctuations appear to be nearly identical, although perhaps slightly the greatest in reduced pressure, and most marked in both during periods of extremes of drought and excesses of precipitation, the latter being attended with

the greatest variations. Prof. Hazen has shown from a study of the observations at the summit and base of Mount Washington, for the months of January, February, and March, during a period of sixteen years, 1871 to 1886, inclusive, that the fluctuations of both pressure and temperature are almost exactly identical. "Occasionally the change in temperature at the summit has preceded that in pressure to such an extent as to cause the pressure phases to lag behind at the summit."

In Appendices No. 80 and 81 will be found the normal values of dry periods, excluding "traces" of rain, and including them. These data are computed from a combination of the long and short periods, during a long series of years. Comparing these values with those for cloudiness and sunshine given in Appendices 85 and 86, it will be observed that the normal dry-period values (August to December, inclusive) reach their maximum during the maximum period of sunshine and the minimum period of cloudiness; another confirmation of the influence of barometric pressure on these conditions. Tate says that when the temperature of the evaporating surface is higher than that of the surrounding air the resulting ascensional current of vapor will facilitate the process of evaporation only during continued sunshine. In the case of heavy cloudiness the temperature of the evaporating surface is lower than that of the surrounding air, resulting in little or no ascensional current of vapor and a retardation of evaporation.

Comparing the normal values of sunshine, cloudiness, and dry periods with the average hourly velocity of the wind (see Appendix No. 87) we find the maximum value of the force occurring from September to April inclusive. The highest of the average maximum wind velocities (see Appendix No. 90) occur also from September to April inclusive.

Secular change in precipitation, as shown in Appendix No. 14, appears to afford some evidence of a regular recurrence of eleven-year periods of excess and deficiency in the Dakotas. Perhaps failure to satisfactorily establish such periods may be due, in a measure, to broken records and want of a longer period of continuous observations. Considering the whole territory together, we find an eleven-year period of excess from 1875 to 1885 inclusive, which is also fairly well marked at some of the stations of longest record. If the records at Fort Randall, S. Dak., were complete for the years 1864, 1865, 1866, they might show an eleven-year period of deficiency in precipitation, ending with 1874 and immediately preceding the eleven-year period of excess, just referred to. During these missing years there was a rather marked deficiency of rainfall, especially in 1866, at Fort Abercrombie, N. Dak.; but this would hardly justify the assumption of a deficiency at Fort Randall, particularly as in 1867 and continually thereafter to include 1870, a marked excess in rainfall was reported from Fort Abercrombie, during which time marked deficiencies prevailed at Fort Randall. The records at Fort Randall, which are complete from 1857 to 1891 inclusive (except 1864 to 1866 inclusive) show a twelve-year period of excess (except a deficiency in 1884) from 1875 to 1886 inclusive.

The combined records for both Dakotas show a thirteen-year period of deficiency (except an excess in 1872) from 1862 to 1874 inclusive. A twenty-year continuous record at Fort Totten, N. Dak., shows an eleven-year period of excess (except deficiencies in 1884 and 1886) from 1877 to 1887 inclusive. A twenty-three year continuous record at Fort Sully, S. Dak., shows an eleven-year deficiency (except excesses in 1883 and 1885) from 1880 to 1891 inclusive. An eighteen-year continuous record at Yankton, S. Dak., shows a thirteen-year period of excess (except deficiencies in 1879, 1880, 1882, and 1884) from 1875 to 1887 inclusive. A twenty one-year record at Fort Buford, N. Dak., shows a thirteen-year period of excess (except deficiencies in 1882, 1883, 1884, 1886, and 1889) from 1879 to 1891 inclusive. A seventeen-year continuous record at Bismarck, N. Dak., shows an eleven-year period of deficiency (except excesses in 1882, 1884, and 1891) from 1881 to 1891 inclusive. A fifteen-year record at Fort Abraham Lincoln, N. Dak., and a sixteen-year record at Fort Pembina, N. Dak., are too much broken to be considered independently. The same may be said of a twelve-year record at Fort Sisseton, S. Dak. The six-year record at Fort Rice, N. Dak., has not been used in computing the mean annual deviations for obvious reasons.

Blanford sought to establish the occurrence of an eleven-year cycle in the Carnatic rainfall of India, from 1864 to 1885 inclusive, through the intervention of harmonic analysis to secure greater precision in the character of the periodical fluctuations than appeared on the face of the records,

but without success. General Strachey, in criticism of this method (*Nature*, July 21, 1887), set forth the statement that—

Such a series of calculated values has no physical signification whatever. The greater or less degree of difference between the observed and calculated quantities only indicates how far the sums of the terms of the harmonic series employed coincide with the series of observed quantities, which the calculated series was designed to represent. The mean variation of the series of observed values, from the mean of all of them, will, of course, be greater than the mean variation of those observed values from a series deliberately calculated so as to correspond with them, such as that obtained by aid of the harmonic series.

Mr. Blanford shortly after admitted the correctness of the above criticism.

Considering all of the annual deviations of precipitation for 1891 collectively, as shown in Appendix No. 14, for each State, the data would appear to indicate that North Dakota is entering upon a period of excess, beginning with that year. The same can be said of South Dakota, but to a less degree, the excess for 1891 being about four-fifths less than in the case of North Dakota. On the contrary, during the period of thirty-one consecutive years from 1861 to 1891, for North Dakota, and during a period of thirty-two years from 1857 to 1891 inclusive (1864, 1865, and 1866 missing) for South Dakota, the former shows an absolute excess about one-third less than appears for the latter. In other words, South Dakota seems to show the greatest tendency to a period of excess from and after 1891.

The mean annual deviation of precipitation for the Dakotas is about 22 per cent, for North Dakota about 23 per cent, and for South Dakota about 21 per cent. Blanford has shown that in British India severe droughts occur in regions where the mean annual rainfall is less than 50 inches with a mean annual deviation of more than 12 per cent. The ravages of drought in any region must depend very largely upon the density of population. Therefore drought in India or China becomes severe with a much larger rainfall and a much smaller variability in precipitation than in any portion of the United States. It must be admitted, however, that with a mean annual rainfall of about 20 inches and a mean annual deviation of about 22 per cent the conditions appear to be favorable for the frequent occurrence of drought in the Dakotas, being most marked in North Dakota and in the central and northwestern portions of both States. The least mean annual deviations are found in the Black Hills and in the Red River valley.

Capt. Wheeler, in his report upon the U. S. Geographical surveys west of the one hundredth meridian, says that—

While farming without irrigation may doubtless be safely carried on where the rainfall exceeds 20 inches, yet for the whole interior basin, and indeed for much of the western mountain region, especially that part south of the fortieth parallel, and particularly not including the more humid northwest, crops may be at least doubled from its use and ordinarily the soil be fertilized from silt deposited. A rainfall of from 12 to 14 inches, properly distributed, would produce cereal crops without irrigation, while in the case of a much greater precipitation, recurring irregularly, it would be requisite. As a rule irrigation implies that the increased production results from a lesser area than that whereupon the necessary amount of rain utilized actually falls.

A study of secular changes as shown in Appendix No. 14, and of the general distribution of precipitation as exhibited in the various charts, diagrams, and tabulations of this monograph, seem to warrant the belief that no important climatic change has taken place in the Dakotas during the past forty years, or is likely to occur in as many years to come. Local and temporary changes, effected through the employment of systems of irrigation and reforestation, are not considered in the above statement because independent of it.

Mr. C. W. Hall, of Dickey County, N. Dak., testified in 1889, before the Senate Committee on Irrigation and Reclamation of Arid Lands, as follows:

This is the driest year we have had for eight years. My acquaintance with this part of the country commenced in August, 1881. In that year the condition of the country was very much the same with regard to dryness that it now is. The Cottonwood was dried up and only some of the lakes remained full. In 1881 and in 1882 there was an immense fall of snow, and the next spring the country was full of water and the crops were the best that were ever known in that section. But since that time the country has dried up. At times the whole country will get wet through and then it will gradually dry up.

Mr. L. R. Casey, of Jamestown, N. Dak., testified as follows:

Farming in Dakota was begun in 1875 by a few venturesome parties in the Red River Valley, but it was 1878 before confidence was established in Dakota sufficient to induce emigration to North Dakota. In ten years, from 1877 to 1887, the population of Dakota as a whole increased from less than 100,000 to something over 600,000. Of that pop-

ulation North Dakota in 1877 had not more than 20,000. In 1887 it had about two-fifths of the whole. The basis of that large emigration to North Dakota was the great success of cropping lands, and the emigration to the country was almost entirely east of the one hundredth meridian. That success continued until 1883. During that summer the precipitation was deficient. For the year it was about as usual, but while in other years there had been good rains in June or July, that season it was not so. And in every year when there has been such lack of rain, crops have not been so good. In the year 1886 there had been scarcely any rainfall in the first part of the season in North Dakota. The crops were languishing and discouragement began to come over the people. On the 3d day of July there was a copious rain, lasting fifteen or twenty minutes in the James River Valley and for three hours in the Red River Valley. The farms in the Red River Valley that had been cropped eleven years without rest, the reports show, gave larger crops that season than ever before, and it all turned on that great rain of the 3d day of July.

Mr. A. W. Burt, of Huron, S. Dak., testified as follows:

I first went to Dakota in the fall of 1881, and moved there to live in the spring of 1882. At that time there was little or no settlement in that country. During the winter of 1880 and 1881 there was in that country what might be called an abnormal snowfall. That snow melted and filled all the lake-beds and low places with water. During the summer of 1882 we had frequent and heavy rains. That season, what little crops there were became fully matured and were good. The vegetables of every description grew to mammoth size. We were all well satisfied that the soil of Dakota was very fertile. In 1883 it was a drier season; still we had plenty of moisture on the surface, and good crops. The summer of 1884 came, and it was drier still, and since that time it has continued to grow drier until the supply of water obtained in 1881 and 1882 became exhausted. The soil of Dakota is black and from 16 to 20 inches deep. Underneath this, especially in the central portion of the Territory, lies a bed of red clay, hard and almost impervious to water. When the water falls upon the surface it penetrates to this subsoil and is held there, so that when the rains are over vegetation may draw from this supply. The only thing is to get the water into the ground. We of Dakota dislike to have our country referred to as an arid country. We have always insisted that we had one of the grandest countries in the world, yet to-day, while still clinging to that belief, we must admit that the farming of that country is substantially reduced to a question of luck.

As to the occurrence of permanent changes in climate, Prof. Upton has shown from a study of long meteorological records in New England that great fluctuations occur in different years, with some indications of periodicity, but no progressive change. The universal popular belief that the climate is changing can only be explained by the short and defective memories of people who recall a few seasons only and who exaggerate the frequency of some special event; by the fact that the fluctuations are large and often in the same direction for several successive years, or by the difference between the impressions of the child and the adult.

Mr. Gannett has compared the observations from twenty-six stations, covering periods of from six to twenty-six years, for the western and northern plains, and found some show of an apparent total increase of 60 inches of rainfall, or a mean of 0.40 inch per year. Other series of observations were compared, of from ten to forty years, in the Central States and in New England, in connection with the influence of forest areas, and it was found that any difference in the amount of rainfall, as affected by the forests, was too slight to be of material importance.

Schott has shown, in Smithsonian Contributions to Knowledge, Atmospheric Temperature, and Atmospheric Precipitation, that—

There is nothing in the meteorological curves to countenance the idea of any permanent change in the climate having taken place, or being about to take place, in the last ninety years of thermometric records, the mean temperatures showing no indication whatever of a sustained rise or fall. The same conclusion has been reached in the discussion of the secular change in rainfall, which appears also to have remained permanent in amount as well as in annual distribution.

While there appears no important change in the amount of precipitation over the Dakotas, from an examination of the longest record, yet the inhabitants of both States report from various sections evidences of a gradual diminution in the amount of rainfall, by the drying up of lakes, ponds, rivers, and the failure of crops.

Mr. W. N. Potter, of Lamoure, N. Dak., testified before the Senate Committee on Irrigation and Reclamation of Arid Lands, 1889, as follows:

Six years ago sloughs nearly impassable by teams were scattered in a majority of the townships, but they are now all dry. The Twin alkali lakes, 3 miles from the town of Lamoure, nearly 2 miles north and south and from 10 to 12 feet deep—now one is dry and the other nearly so. Cottonwood Lake, 1 mile long and one-half mile wide, 9 miles southwest of Lamoure, is now a shallow pond 6 feet lower than it was five years ago. This is about all the surface water except the James River in the entire 1,152 square miles of the county. The James River has been only a shadow of its former self most of the time during the present season. The disappearance of these ponds

has been gradual, more or less from year to year, in the face of the generally received theory that cultivation of the land increases rainfall. Probably the cultivation of the surface has one effect, viz, to arrest the falling water before it reaches the water courses. At the same time it is evident that the supply has diminished and that our farmers have been suffering more and more from year to year. What is true of Lamoure County in these respects is also true of nearly all the present occupied portion of the two Dakotas.

These evidences as to the disappearance of shallow bodies of water and the drying up of the ground are not necessarily indicative of the actual falling off in the amount of rainfall over a vast region like the Dakotas. To develop a permanent deficiency in rainfall would require some catastrophic change in the atmosphere itself rather than in the surface of the country. If there is really an eleven-year cycle of precipitation in the Dakotas, a continued deficiency for such a period of time would undoubtedly result in diminishing the amount of surface water very considerably. But as a marked deficiency in rainfall means an excess of sunshine and warm winds, the strongest influence in the disappearance of the surface water is evaporation.

If the amount of rainfall has not essentially varied during a long series of years, then the disappearance of moisture from the soil and of water from the surface must be due to some modification of that land surface which accelerates evaporation. It is not improbable that the cultivation of the soil in the Dakotas has hastened evaporation, and it may be that the disappearance of the moisture has been largely influenced by the character of the soil, which is a black loam that very readily absorbs the heat. Before cultivation, the hard prairie sod sheds the rain like a "duck's back," the water running off rapidly and gathering in the nearest depressions, keeping the ponds, lakes, and rivers well supplied. With the advance of the conditions of civilization, extending farther and farther westward the limits of agriculture, decided and permanent modifications have been made of the surface of the country, which have increased the opportunity of the soil to absorb the rainfall and at the same time to give it off gradually to the atmosphere through the process of evaporation. These changes have taken place most decidedly where the primitive conditions of the country have been most completely modified by changes incident to settlement.

Prof. Fernow says:

It can no longer be doubted that while the destruction of forests was the chief agency, yet the pastoral habit of the people of western Asia and other oriental countries, once so fertile but now so barren, was one important factor in producing the present dry and barren condition of those countries. No country in the interior of a continent, unless supplied with numerous lakes, or numerous and permanent rivers, can remain permanently fertile and productive if given up largely to pasturage of sheep, goats, and cattle, without cultivation. The rapid destruction of mountain forests and pasturing their slopes and bordering plains will most certainly have a tendency to render that portion of our country more dry and barren.

Mr. Tate says that—

The rate of evaporation from different substances mainly depends upon the roughness or inequalities of their surfaces. Evaporation is most rapid from the roughest or most uneven surfaces. In fact, the best radiators of heat are the best vaporizers of moisture.

The loss of moisture would appear to be greatest from water in commotion than when the surface is quiet; from cultivated land than from unbroken sod; from soil frequently cultivated than from that occasionally so; from bodies of water exposed to the winds than when protected by forests.

Capt. Twining, as chief astronomer of the Northern Boundary Survey, 1872 to 1876, states in his report that—

The streams between the valley of the Red River and the Rocky Mountains, excepting only the mountain torrents flowing to the north into the Bow River and thence into the Saskatchewan, are merely prairie streams, to which the name "river" is only given by sufferance. Many of them are most insignificant of rivulets, which, during the melting of snows in the early spring may carry a reasonable volume of water, but in the summer consist, for the most part, of a series of pools, more or less stagnant, and with no appreciable current. The Mouse River and the Milk River are the most considerable of those along the northern boundary, and may be taken as a type of all the prairie streams of Dakota and Montana. Thus, the Mouse River, though having a length of as much as 400 miles, and draining the eastern slope of the Coteau of the Missouri, from north of Woody Mountain to the bend of the Missouri below Fort Stevenson, yet carries an insignificant volume of water, being reduced to almost nothing during August and September. In like manner, the Milk River, rising near the Rocky Mountains, ceases to flow during the month of August. As these rivers are not fed by springs, the lack of rain and the rapid evaporation reduces the volume of their flow in proportion to the distance from their sources.

Prairie fires are, without doubt, a considerable detriment to the agricultural development of the Dakotas because of augmenting the influences of evaporation. They appear to occur most frequently in autumn when the atmospheric conditions are most favorable for the loss of moisture from the soil, and to the occurrence of drought. Capt. Twining refers to these fires in September, 1873, as follows:

The prairie fires, which for some days had been burning brightly in every direction, had swept every vestige of grass from these plains, except in the immediate vicinity of the ponds, leaving the ground covered with a light film of ashes. Our march from this point was most distressing, owing to this cause. A strong east wind raised the dust and ashes in clouds, filling the eyes, nose, and mouth with an irritating alkali which bit and smarted with undying zeal. We reached Fort Totten on the 20th of October.

The Monthly Weather Review of September, 1890, refers to prairie and forest fires as follows:

In the region about Etta Mine, southwest South Dakota, and Bismarek, prairie and forest fires caused widespread damage.

In September, 1891, as follows:

On the 17th and 18th extensive prairie fires were reported in parts of North Dakota, near Rapid City, S. Dak., and in the northern portion of South Dakota.

The lapse of time and the many changes consequent upon advancing civilization seem to have little effect upon this element of danger to the agricultural interests of a vast territory.

The following information on the subject of drought in the Dakotas is extracted from the Monthly Weather Review:

NORTH DAKOTA.

June, 1883.—Bismarek: Crops suffering from drought.

July, 1885.—Bismarek: Little rain in the immediate vicinity since June 23. Crops suffering seriously for rain. Jamestown: Crops injured by previous drought. Rain of 13th will insure fair yield of wheat.

June, 1886.—Fargo: Extensive and severe drought in nearly all parts of Territory. Mandan: Continued dry weather seriously injured wheat crop.

November, 1886.—The following extracts are from a report prepared by the observer, Signal Service, St. Paul, Minn., on the drought which has prevailed throughout the Northwest during the past summer and autumn:

"The severe drought which has prevailed over the western portion of the country during the summer of 1886 has left its devastating effects on the Upper Mississippi Valley and the Northwest. Its influence was mostly felt in northwestern Minnesota and northeastern Dakota, being most severe and longest in the latter section. Other areas which suffered for shorter periods were northern Iowa, western Wisconsin, southeastern Minnesota, southwestern Dakota, and eastern Montana.

"This paper will treat mainly on its effects in Minnesota and Dakota.

"In these States the usual copious rainfall of May was lessened so considerably that the drought literally began to be appreciable in that month. The temperature was abnormally high, with a deficiency in rainfall of nearly 1 inch.

"In the month of June the temperature was about normal, while the precipitation was nearly $1\frac{1}{2}$ inches below the average in Minnesota, and about 2 inches below in Dakota.

"In July the rainfall continued below the average, with the greatest deficiency occurring in eastern Minnesota and southern Dakota. At Duluth, Minn., the deficiency was 2.42 inches; La Crosse, Wis., 3.08 inches; Huron, Dak., 3.26 inches; and Yankton, Dak., 3.28 inches. The temperature in Dakota was decidedly above the normal, at Huron being 5° above and Bismarek 6° above. In Minnesota it was also above the normal, with the mean temperature of the State 7° above, while the average of the minimum temperatures was 50° . The temperature was phenomenally high during nearly the entire month, while at Sherburne and Spring Valley the maximum temperature was respectively 107° and 104° , which is about the greatest heat ever observed in this State.

"In August there was an excess of over 2 inches of rainfall in the southeastern portion of Dakota, while in northern Dakota and Minnesota the rainfall was below the average; the deficiency being 3.1 inches at St. Vincent and 2.5 inches at Moorhead. The temperature continued above the average with the maximum above 100° north to St. Vincent, where it rose as high as 103° .

September in eastern Minnesota brought an excess of rainfall, while there was a deficiency in western Minnesota and northern Dakota. The temperature was markedly below the normal at Duluth, while it was slightly above in southeastern Dakota.

"In October the rainfall was slightly below the average, while the temperature was decidedly above. For Minnesota the mean temperature was 8° above the mean of the corresponding month of 1885. The greatest departures from the normal were 8° above at Duluth, 6° above at Moorhead, St. Vincent, St. Paul, and Yankton, and 5° above at Huron.

"Pastures became burned and brown early in the season and caught fire readily from sparks of passing trains. Those crops which yielded fairly well were favored with early rains and were past danger when the dry season be-

gan. The effect on newly seeded grass fields has been unusually severe, in many cases rendering the seeding of early spring worthless. Tree seeds in northern Dakota have become very scarce and are in great demand.

"Sloughs, lakes, and rivers, which had the appearance of having been in existence for ages, have become dry, leaving the alluvial soil found in their bottoms to be baked by the burning sun, thus causing it to be cracked over an inch wide and many inches deep in some localities. Regions where there was but a thin layer of soil upon a gravel or stone bottom suffered far more from the drought than those favored by ground of clay formation.

"Prairie fires were much more frequent and did greater damage than in previous years. The removing of the grass covering from the earth by these fires exposed its surface to the direct rays of the sun, thus allowing undue absorption of the moisture from the soil and leaving it in a dry condition. In localities well favored with forests the effects of the drought were largely modified and showers were generally more frequent, thus showing the great necessity of protecting those woodlands which so materially assist in moderating droughts and floods. Rain was also more frequent near large bodies of water and along large streams.

"During the fall of 1885 and winter of 1885 and 1886 the fall of snow and rain was very light, and was followed by a summer marked by a decided deficiency of precipitation, which had the effect of drying sloughs, lakes, and rivers to an almost unprecedented extent, causing the ground in many localities to be as dry as dust to the depth of 8 or 9 feet. This, together with the lack of water all through the West and Northwest, could supply the atmosphere with but little moisture to be precipitated. The universally high temperatures which prevailed added very materially to the injurious effects of the dry weather.

"Were it not for the great number of lakes found in this region, there being 7,000 to 10,000 alone in Minnesota, with an average of 320 acres and upward, and the forests and woodlands which cover one-third of the State, there is no doubt but that the damage would have been far greater.

"In some localities there seems to be a period of increase and decrease in the amount of water in lakes and rivers, while in other localities there seems to be a yearly decrease in the amount of water. * * *

"In Minnesota the drought began in May and ended in August and September in the central and southern portions, while in the northern it continued quite severe until November 1. In length it ranged from forty-one days in the southeastern portion of the State to over five months in the northern portion. * * *

"In Dakota the drought began generally during the latter portion of June and was still existing November 1. It seemed more severe in the western portion of the State; Wells and Stark counties reported the rainfall to be far below the average since July, 1885. The State has also suffered severely from prairie fires, which devastated vast tracts of land; in the northern portion of the State forest fires have done irreparable damage. In some portions of the State trees planted several years ago are in a flourishing condition, showing that timber can be grown and will prove valuable both as a commercial article and as an assistant preventive of drought."

October, 1888.—Bismarek: Weather very dry. No rain since September 19.

May, 1891.—Drought prevailed. Crops in bad condition previous to 18th and 19th. Drought broken on these dates.

SOUTH DAKOTA.

July, 1877.—Olivet: Drought injurious to vegetation.

April, 1879.—Yankton: Wheat suffering.

February, 1882.—Deadwood: Small precipitation of past two months has caused scarcity of water in city and rural districts.

July, 1886.—Aberdeen: Hot winds and unusually warm weather have prevailed in this vicinity for past week. Much damage to wheat. Estimated crop, not more than half the average, as very little rain has fallen during past month. Huron: Ground dry; grain and grass suffering.

May, 1887.—Parkston: Month has been hot and dry. Grain crop seriously injured.

July, 1887.—Parkston: Rain unevenly distributed during month. Some places, abundant; others, only a few miles distant, little rain. Fort Sully: Extremely dry weather has done considerable injury to crops.

October, 1887.—Parkston: Precipitation unusually small and ground very dry. Webster: Very dry, rainfall about 70 per cent below the normal. Fort Randall: Rainfall over 70 per cent below the normal.

General remarks on drought of past six months: The very serious drought which prevailed from May to September in Michigan, Wisconsin, Iowa, Ohio, Indiana, Illinois, Kentucky, and Missouri was slightly ameliorated in northern Wisconsin during October, but the condition of affairs at the end of the month was still serious, as appears from extracts elsewhere. The commencement of this drought was in April last, during which month less than 50 per cent of the average precipitation fell in southern Michigan and Wisconsin, northern Illinois, the southwestern part of Iowa, and the northwestern part of Missouri.

During May a precipitation slightly above the average fell over a belt of country about 60 miles wide, extending from Cincinnati, Ohio, and Frankfort, Ky., westward to Indiana and Illinois, including the immediate valley of the Missouri River as far as Jefferson City; elsewhere in the States previously named the precipitation was largely deficient, especially in Iowa, Illinois, and the northern half of Michigan, where the percentage ranged from 20 to 50 of the average rainfall.

In June the area over which less than half the usual rain fell comprised Iowa, Illinois, southern Wisconsin, southwestern Michigan, and northwestern Indiana. Throughout the section named only from one-tenth to one-fifth of the usual rainfall for June occurred in many places.

During July a slight excess of rainfall fell over the northern half of the lower peninsula of Michigan and central Wisconsin, but throughout the rest of the drought-stricken States, the precipitation generally ranged from 50 to 80 per cent of the average, except in Ohio, southern Indiana, southeastern Illinois, the western parts of Iowa, and Missouri, where the amount of rain in some cases was only from 15 to 30 per cent of the mean.

During August slight excesses fell in western Iowa, western Wisconsin, and the northern part of Illinois; throughout the rest of the drought district the rainfall was generally from one half to three-fourths of the average, but in the greater part of Michigan, as well as in the southern part of Illinois, the amount was less than one-half the mean.

In September the greater part of Iowa, Wisconsin, and northern Illinois, and the extreme southern part of Michigan was relieved by rainfall slightly in excess of the average, but the remaining States still suffered from a deficiency for the month, which in the northern part of Michigan ranged from one-sixth to one-half the usual amount.

The condition of affairs has improved materially in Wisconsin during October, where a slight excess of precipitation has fallen. In Michigan, Iowa, the greater part of Illinois, and Indiana the drought is aggravated, as the precipitation has only been from one-third to three-fourths of the usual amount, while in the valley of the Ohio and of the Mississippi, from Cairo to Quincy, the amount of rainfall has been exceedingly small, not averaging more than 20 per cent for that district and ranging from 10 to 30 per cent.

During the six months from May to October, inclusive, the rainfall has been largely deficient over Minnesota, Wisconsin, Michigan, Iowa, Missouri, Indiana, Illinois, Kentucky, and parts of Minnesota and Dakota, and eastern Nebraska and southeastern Kansas. Less than one-half the usual amount of rainfall during these months has fallen in central Ohio and at certain points on the immediate banks of the Ohio River, from Louisville to Cairo, inclusive. Similar local deficiencies, averaging more than 50 per cent, occurred near Springfield, Ill., Webster, Dak., and Lacro, Wis. Less than three-fourths of the average amount of rain has fallen during these five months from Michigan, Ohio, and Kentucky westward to include Missouri and Iowa.

Unless an excess of rainfall occurs during November these States must suffer, owing to the small amount of water which fell during the first of the season, as streams and wells must fail and the ground itself be in such a dry condition as to interfere more or less materially with the winter wheat or the early spring crops.

April, 1888.—Yankton: Rain of 27th benefited crops, which were suffering from drought.

July, 1888.—Yankton: Protracted drought caused damage to small grain. Drought broken by heavy rains on 13th.

September, 1888.—Huron: Rain much needed for fall work. Ground has not been dry to such great depth in nine years.

October, 1888.—Woonsocket: Owing to very dry weather plowing has been delayed to greater extent than during the last eight years.

June, 1889.—Parkston: Ground intensely dry; all vegetation withering. Such drought has not existed in this section since its settlement. Spearfish: Last half of month very hot and dry. Where there was no irrigation crops of small grain suffered considerably. Wolsey: Rainfall for month below the average; vegetation suffering. Woonsocket: Continued dry weather; wheat and oats materially damaged.

August, 1889.—Fort Sully: Continued dry weather has injured corn, oats, and other late crops. Woonsocket: Ground drier than for past eight years. Corn, that promised a fall crop on 1st of month, will not yield more than one-third. Oats and barley suffered considerable damage. Huron: Long, protracted drought, felt on 5th, has become very serious. Late crops much injured. Corn can not mature. Wells running dry. Dakota River lower than ever known before.

September, 1889.—Fort Sully: Corn crop completely parched by continued dry weather.

April, 1890.—Huron: Continued drought damaging sprouting grain.

July, 1890.—Woonsocket: Ground exceedingly dry. Wells becoming dry. All crops unusually light. Huron:

Drought and hot winds had a bad effect upon late crops. Webster: Vegetation suffering.

August, 1890.—Late crops reported injured.

September, 1890.—Wolsey and Woonsocket: Streams and wells reported going dry; ground drier than in ten years.

October, 1890.—Woonsocket: Drought continued during month. Very little plowing was done.

May, 1891.—Drought prevailed. Crops in bad condition previous to 18th and 19th. Drought broken on these dates.

July, 1891.—East central South Dakota: Month very dry. Crops damaged.

September, 1891.—Very dry weather prevailed.

The following statement relative to "the great drought," from 1887 to 1891 over the western and northern plains, is extracted from the Sioux City Journal, Sioux City, Iowa, December, 1891:

It may now be said that the great drought, which for several years afflicted the interior of the continent, a large portion of the Rocky Mountain region as well as the whole Mississippi Valley, has been broken. The extent and severity of the great drought have not been generally understood.

The drought began as early as 1887 and was not generally checked till the winter of 1890 and 1891. It reached its climax in the season of 1890, when the wheat crop of the United States was cut down almost 100,000,000 bushels below the preceding year, which latter itself had been greatly shortened by drought; the corn crop, 600,000,000 bushels; the oat crop, 230,000,000 bushels, and other great crops, like hay, potatoes, etc., in similar degree.

The drought was felt through all these years, in varying degrees of severity, from the Gulf coast northward over all the States bordering the Mississippi and Missouri rivers far into the British Possessions. It shortened crops in Illinois and Iowa materially, and it was more severe in Kentucky, Tennessee, and especially in Arkansas and large portions of Missouri.

But the fierce brunt of the drought fell upon that vast strip of plain country which lies west of the ninety-seventh meridian of longitude, including the western two-thirds of North Dakota, South Dakota, Nebraska, Kansas, Indian Territory, New Mexico, and the major portion of the great State of Texas. Throughout this region the drought was general, although much more severe in one locality than in another. In extensive areas crops were total failures, and even in other areas which are exclusively devoted to grazing grass was almost burned up and water disappeared. In many places where the Government surveys have marked the meanderings of extensive lakes or marshes, as in some localities in South Dakota, and where such had been known to exist up to 1887, the water totally disappeared.

It was the greatest drought which the record of half a century in that region gives any intimation of. There has been nothing comparable with it. Its results were far-reaching. They were the more serious because for a period of several years prior to 1887 immigration had been pouring into the region west of the ninety-seventh meridian. Nearly all the settlers were poor, the majority very poor. They had come in quest of Government land, in most cases with barely means more than to effect a settlement. They were borrowers. For a period of several years loan companies sold an immense number of loans on these settlements to people living in all the States to the East, and very largely to people living in New England. The loans went into improvements, into farm machinery, and into other means for cultivating the land.

Under such circumstances, even if there had not been others to aggravate the situation, a drought extending over a series of years could not fail to be disastrous. Year after year in some localities the settlers suffered total loss of crops and were deprived not only of the means of repaying the money they had borrowed, but even of subsistence. At length some became so discouraged as to abandon their settlements. Those who had loaned money to the settlers suffered with them, often neither principal nor interest being paid. It was not understood in the East that an extraordinary drought was in progress, and the country got a hard name, which attached not only to the stricken districts, but also to regions where the effect was not so severely felt. Capital ceased to move towards the settlers and began to be withdrawn to the extent possible.

In Missouri, Illinois, and Iowa, and in similar communities, where for the most part the drought was not so severe, the people, by their longer establishment and accumulations, were incomparably better prepared to endure it. There were some regions, of course, which were more fortunate than the country generally. The one which suffered least in the United States was a comparatively narrow belt on both sides of the Missouri River in north-western Missouri and extending north along the boundary between Iowa and Nebraska, gradually broadening to its greatest width, which included the northeastern counties of Nebraska and a number of counties of Dakota and northwestern Iowa, the central point of which is Sioux City. Drought, indeed, shortened crops even here, but the peculiarity of the soil, the great depth of the fine, spongy, friable soil, free from stratified rocks, greatly modified the injurious effects, so that nowhere else in all those years was there so high an average yield as here.

Outside of southwestern Texas and extensive portions of New Mexico, this extraordinary drought was broken in the winter of 1890-91. There were copious rains, followed by a heavy, general snowfall, which melted away gradually late in the spring. Frequent rain showers occurred all through the season, filling up the old marsh and lake beds. The result was the prodigious crops of every kind which the whole interior of the continent, the region west as well as the region east of the ninety-seventh meridian, produced in 1891.

Heavy rains last fall and early in the winter have not only again saturated the earth throughout the West and made absolutely sure a crop this year, but have also shown that the last vestige of the drought period has disappeared and the West has entered upon a cycle of abundant moisture.

TEMPERATURE.

The distribution of temperature and its relation to other meteorological elements in forming part of the subject-matter of the brief climatological study in this report is treated of in fifteen charts, forty-two diagrams, and twenty-one separate tabulations, referred to as Appendices Nos. 40 to 79 inclusive, and 99 to 140, inclusive. The data in Appendices 40 to 45 and 67 to 79, inclusive, constitute the basis of analytical study under this head. The monthly and annual means are expressed in the nearest degree and this rule has been followed in the preparation of all tables of temperature values. Fractions of a degree to the amount of five-tenths or less have been neglected, but those equaling or exceeding six-tenths have been considered as integers. Greater refinement is not justified by the character of the data or the scope of the discussion.

In the presentation of monthly means and extremes of temperature broken records of a month or more are given, in addition to those of long and continuous periods of observation. The latter, of course, are the more valuable, but within a region of such vast extent as that embraced by the Dakotas, and where the distribution of stations, together with the length of records, has been so inadequate, it has seemed very desirable and even absolutely necessary to submit all data of suffi-

cient value to fairly determine a single monthly mean or extreme. In publications of this character it has usually been the policy to neglect temperature and precipitation values where the records at any station fell short of a complete year. The thirteen charts of monthly and average temperatures have been prepared without the usual employment of isometric lines. The reason for this, as set forth under precipitation (see page 12), regarding the monthly and annual charts of rainfall, will apply in the case of temperature.

Temperature data are submitted from selected stations (see Appendix No. 41) from regions surrounding the Dakotas, especially to the north and south. Comparisons under such conditions serve to disclose some of the peculiarities of climatology characteristic of the Northern Plains. From a study of the distribution of average temperature in the Dakotas, as shown upon the monthly charts, and from an investigation of the distinctive features of thermometric conditions as exhibited by the various tabulations, the following are some of the conclusions and statements which may be offered:

1. The higher average temperature of South Dakota, due to latitude and independent of elevation.

2. The high average temperature of the Black Hills in winter and the low average of summer, as compared with the remainder of South Dakota. This mountain region is protected by heavy forests from the high and dry, cold winds which sweep the more exposed portions of the territory. These differences apply also to the maximum and minimum temperatures, and to the ranges, monthly, annual, and mean annual.

3. The average monthly temperature of North Dakota, computed from fifteen stations, ranges from 3° in January to 70° in July, the extremes varying from -3° at Richardton and Fort Pembina (St. Vincent, across the river, -6°) in January to 71° at Fort Stevenson and 75° at Fort Rice in July. The Red River Valley is both the warmest region in summer and the coldest in winter in North Dakota. The James River Valley comes next, followed by the Missouri Valley.

4. The average monthly temperature in South Dakota, computed from eighteen stations, ranges from 13° in January to 72° in July, the extremes varying from 3° at Fort Sisseton and 4° at Webster in January to 75° at Fort Sully and 76° at Fort Randall and Vermillion in July. The coldest portion of South Dakota is found in the extreme northeast and the warmest in the Missouri Valley. The extreme eastern portion of the State is colder in winter and spring than in the Black Hills, but much warmer in the summer. The James River Valley is, next after the Missouri Valley, the warmest portion of South Dakota.

5. North and South Dakota approach within about 2° of each other during the summer, but diverge to the extent of 4° to 10° in autumn and winter, North Dakota being colder. In the dry season, October to March, inclusive, they diverge about 7° , and in the wet season, April to September, inclusive, they are about equal. Considering the dry season to include September to March, inclusive, the divergence is still 7° , but in the wet season, April to August, inclusive, they change from equality to a difference of 2° . Narrowing down the dry season to four months, November to February, inclusive, the divergence is still about 7° . Extending the wet season to eight months, April to March, inclusive, the divergence increases to about 4° . Comparing the wettest period of the year, May to August, inclusive, the divergence remains steady at about 2° . It is then evident that the mean temperature of the dry season is controlled by the four winter months (November to February, inclusive), the driest period of the year, and that the mean temperature of the wet season is controlled by the four summer months (May to August, inclusive), the wettest period of the year. (See Appendices Nos. 5, 40, 41, and 54 to 57 inclusive.)

6. The mean annual range of temperature in North Dakota varies from 132° at Bismarck to 141° at Fort Buford. The extremes vary from 116° at Fort Buford to 151° at Fort Yates and Fort Pembina, and 154° at Fort Buford. In South Dakota the mean annual range of temperature varies from 116° at Deadwood and 119° at Yankton to 132° at Fort Sully, and 138° at Webster. The extremes vary from 103° at Fort Randall and 106° at Deadwood to 145° at Fort Randall, and 146° at Webster. The annual ranges of temperature are greatest in North Dakota, reaching a maximum in the Red River Valley and in the extreme northwest portion. The least ranges are in the Black Hills and the Missouri Valley of South Dakota. Compared with adjacent regions it is found that the district of maximum annual range embraces northeastern Montana and the Saskat-

chewan Valley. The largest ranges are reported from Poplar River, Mont., 159° ; Medicine Hat, British America, 158° ; and Fort Assinniboine, Mont., 157° . (See Appendix No. 47.)

7. The mean monthly range of temperature in North Dakota varies from 47° at Fort Totten in July to 80° at Fort Buford in January. In South Dakota the range varies from 45° at Yankton and 47° at Deadwood, in July, to 83° at Webster and 86° at Fort Meade, in February. The monthly ranges during winter are considerably the highest in South Dakota and occur later in the season. (See Appendix No. 48.)

8. The mean daily temperature ranges are quite uniform in both States and throughout the year. The least ranges are found in the Black Hills with a mean annual of 21° , and the extremes varying from 18° in December and 19° in April to 23° in January. Generally the highest daily ranges occur in both States from July to October inclusive, and vary from 20° to 29° , the highest being in northwest North Dakota and the lowest in the Black Hills. (See Appendix No. 49.)

9. The maximum daily ranges of temperature vary in North Dakota from 30° at Bismarck, in July, to 57° at the same station in January, and 55° at Fort Buford in February. In South Dakota they vary from 25° at Deadwood in March and 27° at Yankton in June to 54° at Huron, in December, and 55° at Deadwood in January. (See Appendix No. 50.)

10. The minimum daily ranges in North Dakota vary from 1° at Bismarck in December and at Fort Buford in May to 18° at Bismarck in June and 21° at Fort Yates in August. In South Dakota they vary from 1° at Fort Sully in December to 13° at Deadwood in June and 17° at Huron in the same month. (See Appendix No. 51.)

11. The mean daily variability of temperature (the change which takes place in the daily mean temperature from one day to another, independent of increase or diminution of temperature, and the best test of equability) varies, on the average, in both States from 4° during June to August inclusive, to 9° in January and February. The extremes vary from 4° in the Missouri Valley, June to August, inclusive, to 10° in the Red River Valley in January and February. (See Appendix No. 53.)

12. The extreme maximum temperatures in North Dakota range from 101° at Fort Pembina in August, 1886, to 110° at Fort Rice in July, 1871, and at Fort Abraham Lincoln in August, 1876. In South Dakota they range from 101° at Brookings in July, 1888, to 112° at Fort Randall in July, 1874, Forest City, August, 1891, and Smithville, August, 1881, to 114° at Fort Sully in July, 1871. In both States the maximum temperatures rise above 100° from June to September, inclusive, occurring most frequently in South Dakota and in the central portion of that State. The lowest extreme maximum temperatures are found in the Red River Valley and in the Black Hills. (See Appendix No. 65.)

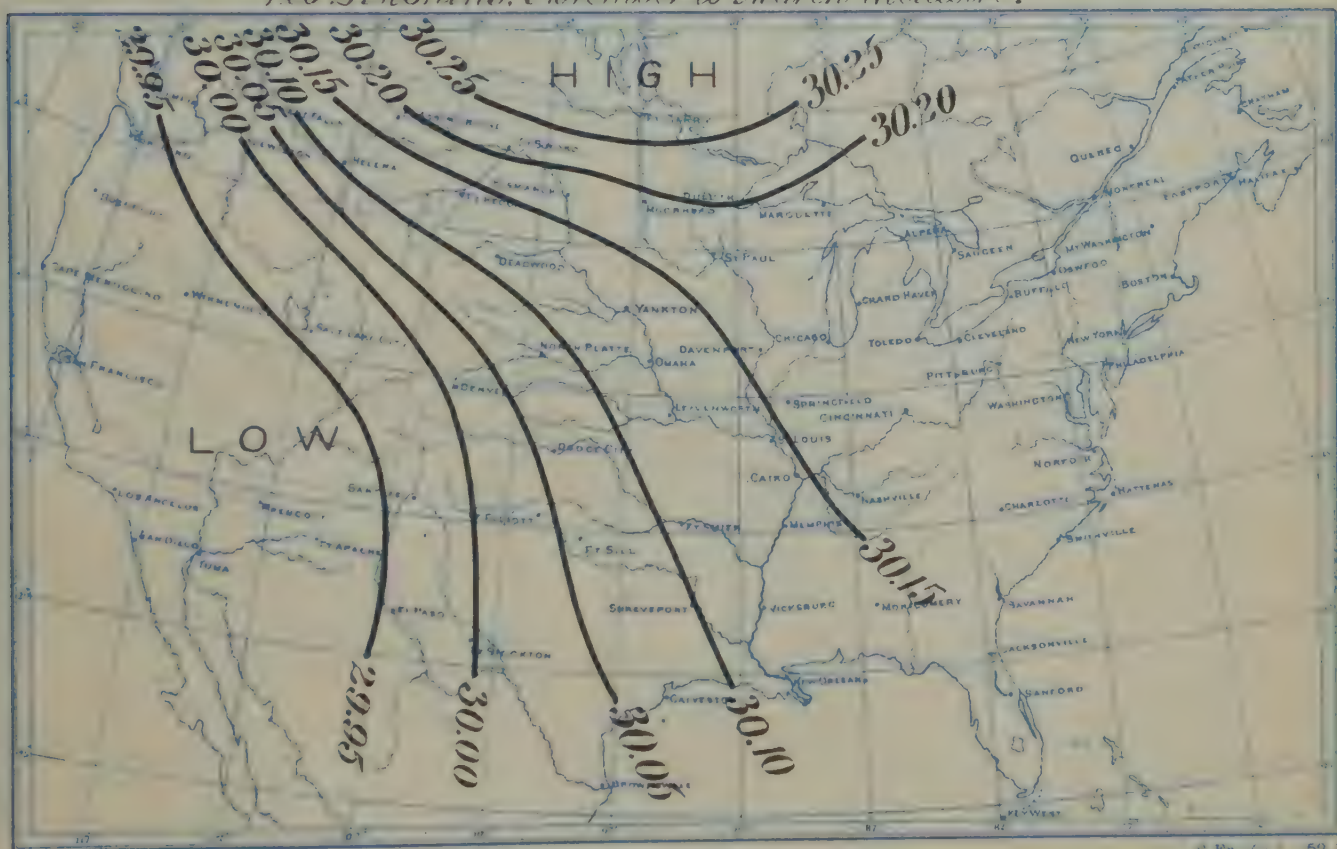
13. The extreme minimum temperatures in North Dakota range from -34° at Fort Rice in December, 1871, to -51° at Fort Pembina in January, 1888, and -54° at Fort Stevenson in December, 1879, and -55° at the same station in January, 1881. In South Dakota they range from -32° at Deadwood in February, 1883, to -44° at Fort Randall in January, 1875, at Webster in January, 1887, and -45° at Fort Sisseton in December, 1880. In both States the minimum temperatures fall below zero from November to March, inclusive. In North Dakota the months of October and April are included in this record of low temperatures, especially in the Red River Valley. Fort Pembina, N. Dak., and St. Vincent, Minn., just across the river, are the only stations where the *annual* minimum temperature falls *below* zero, the lowest record being -4° at Fort Pembina in 1875 and 1887, and at St. Vincent in 1887. (See Appendix No. 66.)

14. The time of occurrence of first killing frost in North Dakota ranges from August 4 (Napoleon, 1890) to September 30 (Fort Buford and Fort Totten, 1884). The time of occurrence of last killing frost ranges from March 17 (Steele, 1890) to June 24 (Fort Totten, 1887). (See Appendix No. 63.)

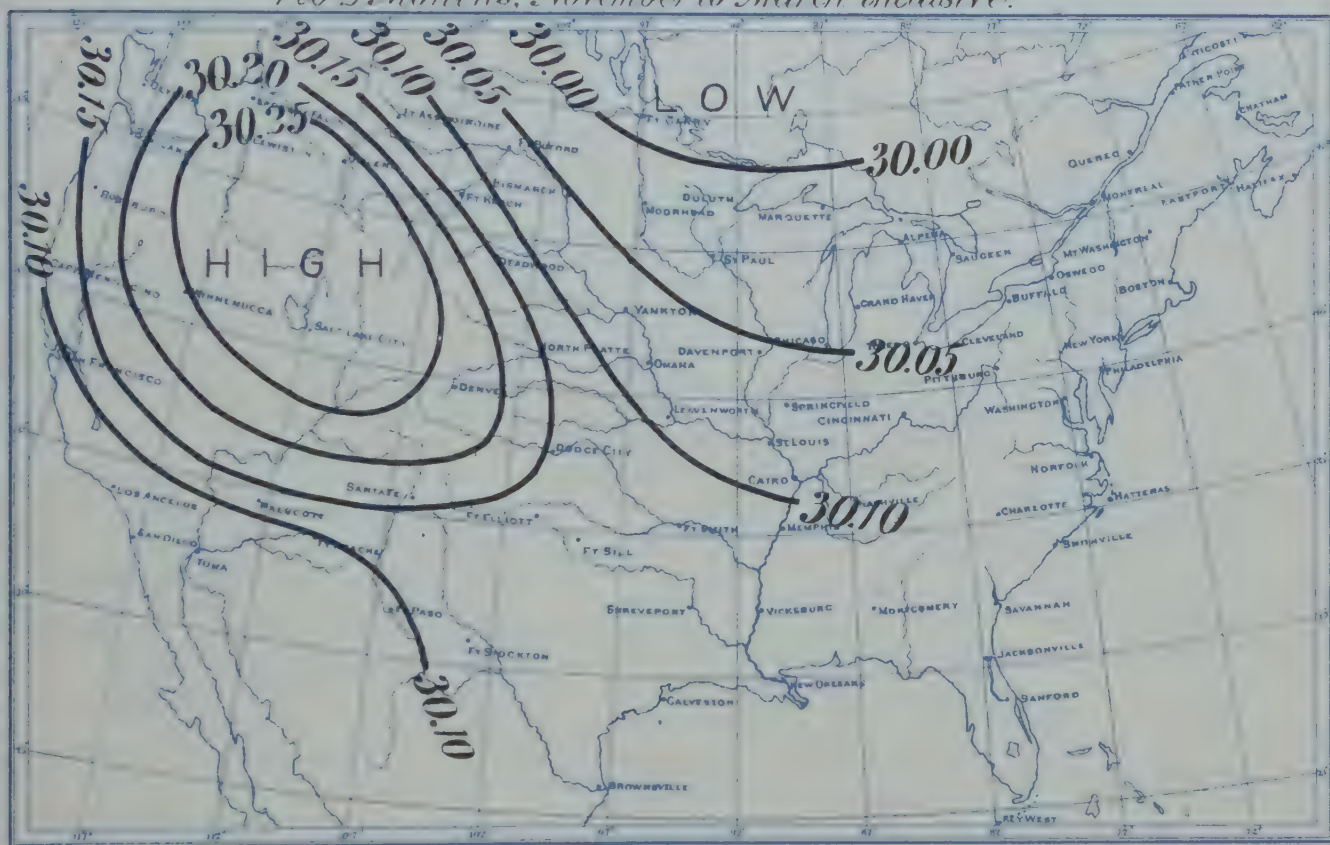
15. The time of occurrence of first killing frost in South Dakota ranges from August 22 (St. Lawrence, Webster, and Woonsocket, 1890) to October 21 (Yankton, 1884). The time of occurrence of last killing frost ranges from April 7 (Fort Sully, 1888) to June 22 (Huron, 1885). (See Appendix No. 64.)

16. The coldest weather prevails in North Dakota and throughout the territory east of the Missouri. the lowest average temperatures being reported from the Red River Valley. In summer the Missouri Valley receives the maximum amount of heat.

An Ideal Typical Chart of Monthly Average Barometric Pressure Indicative of Abnormally Cold Weather in the Dakotas for from 1 to 2 Months, November to March inclusive.



*An Ideal Typical Chart of Monthly Average Barometric Pressure
Indicative of Abnormally Warm Weather in the Dakotas for from
1 to 2 Months, November to March inclusive.*



17. From an examination of the distribution of temperature over the Northern plains, Manitoba, and Hudson Bay Territory, it is evident that eastern North Dakota lies within the southwest quadrant of the area of maximum cold in the interior of the continent, and that with northeastern Montana and northwestern Minnesota it forms the region of greatest cold in the United States.

18. The marked increase in temperature west of the one hundred and eighth meridian, even as far north as the fifty-fifth parallel, shows the influence of the high northerly path of warm low-pressure areas from the Pacific. These disturbances rapidly diminish in intensity as they progress eastward, reaching the maximum effect in this particular, from loss of heat and moisture, at about the one hundredth meridian, when they begin to develop renewed energy through the influence of these elements brought by the southerly winds from the Gulf.

19. The Dakotas, Minnesota, and Montana lie within the region over which the most pronounced areas of high pressure descend from the interior of British America. These highs appear to produce their maximum effect, from the cold, dry air of the upper atmosphere, over the region from Hudson Bay southwestward to northern Montana, northern Dakota, and northern Minnesota, and thence eastward north of the forty-seventh parallel.

20. North Dakota and northeast South Dakota are subjected to the coldest winds, and those of the highest velocity, which tend to remove the snow from exposed and cultivated lands and deprive them of the protection afforded by such a covering.

21. The distribution of temperature is governed very largely by the distribution of atmospheric pressure. Abnormal periods of heat and cold depend broadly upon the average latitude of areas of low barometric pressure in transit over the Dakotas. These facts are graphically set forth in Appendices Nos. 99 to 138, inclusive, and in Nos. 147 to 158, inclusive. The cumulative effect of warm and cold periods, under the influence of the distribution of atmospheric pressure, is graphically shown in Appendices Nos. 58 to 61, inclusive. The warm periods for the months of January, 1889, 1891, and February, 1886, show a total excess of temperature of over 400°. During these months the average latitude of areas of low pressure was considerably north of the forty-ninth parallel, thus bringing over the Dakotas, by means of cyclonic circulation, the warmer air of the Gulf and Mississippi Valley. A corresponding effect from the cold periods is shown for the months of January, 1886, 1887, and February, 1887, when the total deficiency of temperature amounted to over 400°. During these periods the average latitude of areas of low pressure was south of the forty-seventh parallel, which had the effect of carrying over the Dakotas, from British America, an abnormal quantity of cold, dry air by means of anticyclonic circulation. A comparison of the attendant conditions of these warm and cold periods brings to view a remarkable compensating effect in the annual distribution of temperature and disposes of the theory of permanent climatic changes.

22. The relation established between the distribution of temperature and that of barometric pressure in the development and progressive movement of low-pressure areas, as shown by the charts and tables for warm and cold periods (Appendices Nos. 58 to 61, inclusive), may be applied to the demonstration of the causes giving rise to the occurrence of any abnormally warm or cold month of the year.

23. As to the more remote but yet more important causes, because forming the basis of foreknowledge as to the probable occurrence of warm and cold periods, the study of mean monthly barometric pressure would seem to justify the preparation of the accompanying ideal typical chart. An explanation of the construction of these charts is furnished under the head of "Precipitation" (see page 12), where similar ones are submitted in connection with the forecasting of dry and wet periods.

A distribution of average barometric pressure, giving rise to the formation of a pronounced HIGH over the Plateau and Rocky Mountain regions, will generally result in diverting the majority of the paths of all low-pressure areas to the northward of the forty-seventh parallel and result in carrying over the Dakotas the much warmer air of lower latitudes, giving rise to abnormally warm weather. If, on the contrary, the barometric pressure remains abnormally high over Manitoba and Hudson Bay Territory the low-pressure areas are diverted southward below the forty-fourth parallel, and the attendant system of atmospheric circulation gives rise to a prepon-

derance of cold air over the Dakotas, with abnormally low temperatures. If, for example, the mean isobars of November develop the warm-weather type, abnormally high temperatures (usually warm days in periods of 2 to 5) may be reasonably expected in December and January following. If the type chart appears in January, then the warm periods may be expected in February and March. A similar explanation applies to the occurrence of cold-weather types.

24. The general direction of low-pressure areas over the Dakotas and adjacent regions to the north and south, as illustrated on the Monthly Storm Track Charts, Appendices Nos. 147 to 158, inclusive, explain the occasion for the continued alternation of warm and cold periods and the occurrence of extraordinary extremes of temperature. The direction of progressive movement is so nearly due east and west that atmospheric circulation over the Dakotas is practically confined to either northerly or southerly winds. Under such circumstances the tendency to extremes of temperature is very strong and must result in a peculiar effect upon the industrial interests of the two States. It is hopeless to expect any radical change in the atmosphere itself, but the surface of the country in relation thereto, may be modified by cultivation, irrigation, and the growth of forests so as to diminish the effect of abnormal and destructive weather changes. In the protection of considerable areas of land it would appear advisable to plant the trees in comparatively narrow strips, extending east and west. They would not only diminish evaporation from the soil over the protected area, and thus lessen the range of temperature, but by interrupting the course of the winds destroy their effect in developing and maintaining extremes of temperature and abnormal evaporation.

25. The annual distribution of temperature over the Dakotas, as shown by the records for a long series of years, a tabulation of which appears in Appendix No. 56, develops no well-established cycle, perhaps because the records are not sufficiently extensive and uniform as to the length of the period of observation. From an examination of the annual sums there appears some evidence of the existence of two and three-year cycles of temperature changes, the latter being practically confined to excess of temperature (warm periods) and the former to deficiency of temperature (cold periods). This results in an apparent increase in temperature in North Dakota of about 2° in the past 30 years, while in South Dakota during the past 33 years the records appear to show a deficiency of about 1° . If the records were satisfactory in all respects we might say that the Dakotas have been gradually growing warmer since about 1860, North Dakota taking the lead. The tabulation appears to indicate that the alternation of warm and cold periods is so evenly balanced and of such short duration that all tendency to permanent excesses or deficiencies is prevented. There is also developed the important fact that the yearly departures are often very sharp and considerable, illustrating one of the characteristic features of the climatology of the Dakotas.

It is necessary that the climatology of every State, or larger areas having uniform climatic conditions, should be thoroughly investigated and discussed before satisfactory comparisons in important details, affecting animal and plant life, can be made in a comparative study of the whole country.

CONCLUSION.

In a brief summarization of final deductive results the following are submitted as some of the lessons which may be drawn from this investigation:

1. The Dakotas must resort to an extensive system of irrigation.
2. Forests must be preserved and extensive reforestation adopted.
3. Increase the number of rainfall stations and make the reports accurate and continuous.
4. If there are great local variations in rainfall they should be carefully investigated.
5. Increase the area covered with vegetation.
6. Pursue some method in cultivating the soil whereby the snowfall may be prevented from drifting away under the influence of the winds. Plowing shallow ditches every few rods or the growing of hedges every few hundred yards might accomplish the object sought.
7. The distribution of temperature and precipitation in the Black Hills furnishes an instructive lesson as to the influence of forests on climate.

8. The distribution of precipitation throughout the year, while favorable, in a measure, to agricultural interests, is too small in the aggregate to prevent the occurrence of severe droughts, especially in North Dakota and the central portion of South Dakota.

9. The snowfall is too light and the winds are too heavy to secure from this form of precipitation much, if any, protection to crops.

10. The precipitation of spring and summer compares favorably with the moist regions of the Central Mississippi and Ohio valleys, but the precipitation of autumn and winter shows a pronounced deficiency, which makes the average of these seasons less than in the arid regions of the Middle Plateau.

11. The geographical position of the Dakotas is such, relative to the path of atmospheric disturbances between the Pacific and the Atlantic, near the forty-ninth parallel, that no important permanent change can reasonably be expected in the amount and distribution of their precipitation.

12. The withering effect of the hot, dry southerly winds may be obviated, in a measure, by spraying plants and trees with water and irrigating the soil beneath them.

13. The Dakotas lie within what is called the "subhumid region," a mean condition between the arid and moist regions of the country, where agriculture can hardly be conducted without years of drought succeeding years of prosperity, and where irrigation from artesian wells and storage reservoirs must be resorted to in order to tide over the unpropitious seasons.

14. A careful hydrographic survey of the Dakotas should be made in order to obtain reliable and exhaustive information on the subject of evaporation, in connection with the supply and distribution of precipitation, and the establishment of a satisfactory system of irrigation.

15. Every feasible means of checking evaporation must be adopted. Wind-breaks of trees or hedges may be employed to this end. Becquerel has ascertained that a hedge 6 feet in height will afford protection to the surrounding soil a distance of 70 feet. Experiments have shown that a narrow belt of trees, every 300 to 1,000 feet, according to the character of the soil and the kind of vegetation, will offer protection from the drying effect of winds.

16. The meteorological and physical features of the Dakotas are such that under the influence of settlement and the consequent development of agriculture changes are effected which tend to the rapid dissipation of the moderate rainfall, through absorption and evaporation. Irrigation and reforestation are the only remedies.

17. The creation of lakes, ponds, and rivers in the Dakotas, with the expectation of thereby increasing the amount of local evaporation, and that a corresponding increase in precipitation will follow over the same region, is hardly justified by the meteorological records. Precipitation over the Dakotas is not the result of local influences. It has been shown that the controlling influence in precipitation comes from a vast system of cyclonic circulation or atmospheric eddies passing across the country near the forty-ninth parallel, absorbing moisture from the waters of the Pacific, the snowbeds of the Rockies and Sierra Nevadas, and the warm waters of the Gulf.

18. Prairie fires should be prevented, as they increase evaporation by setting up convection currents in the atmosphere and augmenting the drying effect of the usual winds.

19. Both Dakotas need a greater variety of wind currents. The abnormal excess of northerly and southerly winds is productive of destructive extremes in temperature and evaporation.

20. As the population of the two States increase the deleterious effect from deficiency in precipitation and high evaporation must become more severe unless overcome by the employment of irrigation. Mr. J. J. Cushing, of Ashton, S. Dak., testified before the Senate Committee on Irrigation in 1889 as follows:

In Dakota Territory the best calculation for the last two years places the loss at \$25,000,000 a year from the failure of its water supply.

21. The occurrence of drought in the Dakotas bears such a close relation to the distribution of atmospheric pressure over the north-central portion of the United States that it becomes an inevitable result unless obviated through the intervention of artificial influences.

APPENDIX No. 1.

List of Appendices.

- No. 1.—Classified list of appendices.
- No. 2.—Chronological list of stations, with latitude, longitude, and elevation, length and character of record, for North Dakota and South Dakota.
- No. 3.—Chart: Geographical list of stations.
- No. 4.—Monthly and annual precipitation.
- No. 5.—Normal monthly and annual precipitation.
- No. 6.—Monthly and annual precipitation averages from certain selected stations.
- No. 7.—Monthly and annual amounts and averages of unmelted snow.
- No. 8.—Amounts of unmelted snow on ground (inches) at end of month.
- No. 9.—Monthly average number of rainy days.
- No. 10.—Percentage of probability of rainy-days.
- No. 11.—Monthly average number of clear days.
- No. 12.—Average snowfall in inches (Manitoba).
- No. 13.—Average snowfall in inches (British Columbia).
- No. 14.—Mean annual precipitation with annual and mean annual deviation in inches.
- No. 15.—Excessive precipitation (North Dakota).
- No. 16.—Excessive precipitation (South Dakota).
- No. 17.—Seasonal precipitation normals: Quarterly values.
- No. 18.—Seasonal precipitation normals: Dry season, winter; wet season, spring, summer, and autumn.
- No. 19.—Seasonal precipitation normals: Dry season, winter, spring, and autumn; wet season, summer.
- No. 20.—Seasonal precipitation normals: Dry season, October to March, inclusive; wet season, April to September, inclusive.
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APPENDIX No. 2.

Chronological list of stations in North Dakota, South Dakota, Nebraska, Iowa, and Minnesota, with reference to location and to character and extent of meteorological observations.

The names are arranged alphabetically without regard to geographical position. The latitude and longitude have been taken from the latest standard maps. In the case of broken records the extent of the missing portions can be ascertained by reference to the tabulated data elsewhere in this report. The elevations above sea level have been taken from the Dictionary of Altitudes, U. S. Geological Survey, and from the Weather Bureau reports.

[Abbreviations: V. O., voluntary observer; W. B., Weather Bureau; U. S. P. H., United States post hospital.]

NORTH DAKOTA.

Station.	County.	Longi- tude.	Lati- tude.	Eleva- tion above sea level.
		° ' "	° ' "	Feet.
Abercrombie, Fort	Richland	96 47	46 27	.....
Abraham Lincoln, Fort	Morton	100 51	46 45	2, 211
Bathgate	Pembina	97 28	48 52	.....
Berthold, Fort	Garfield	101 45	47 35	.....
Bismarek	Burleigh	100 48	46 47	1, 668
Buford, Fort	Buford	103 56	48 00	2, 017
Carrington	Foster	99 07	47 36	.....
Church's Ferry	Ramsey	99 08	48 15	.....
Davenport	Cass	97 03	46 43	921
Devils Lake	Ramsey	98 54	48 08	1, 467
Dickinson	Stark	100 45	46 52	2, 403
Ellendale	Dickey	98 32	46 01	.....
Fargo	Cass	96 48	46 52	903
Farmington	Richland	96 43	46 18	.....
Gallatin	Griggs	97 58	47 21	.....
Grafton	Walsh	97 24	48 25	.....
Grand Forks	Grand Forks	97 04	47 55	.....
Grand Rapids	La Moure	98 20	46 25	.....
Hope	Steele	97 42	47 18	.....
Jamestown	Stutsman	98 40	46 52	1, 395
Kelso	Truitt	97 01	47 20	.....
Lakota	Nelson	98 20	48 02	.....
Leech Farm	Cass	96 45	46 50	.....
Mandan	Morton	100 52	46 50	1, 644
Milton	Cavalier	98 00	48 40	.....
Minot	Ward	101 30	48 15	.....
Napoleon	Logan	99 38	46 30	.....
New England City	Billings	102 57	46 34	.....
Pembina	Pembina	97 10	48 56	791
Pembina, Fort	do	97 03	48 57	750
Power	Richland	97 12	46 33	.....
Ransom, Fort	Ransom	97 55	46 32	1, 438
Rice, Fort	Richland	96 53	46 07	.....
Richardton	Stark	102 17	46 52	2, 464
St. Johns	Rolette	99 45	48 49	.....
St. Thomas	Pembina	97 26	48 37	.....
Sanborn	Barnes	48 12	46 58	1, 460
Seward, Fort	Stutsman	98 49	46 55	.....
Sheyenne	Eddy	99 08	47 48	1, 200
Spiritwood	Stutsman	98 29	46 56	1, 477
Steele	Kidder	99 52	46 50	1, 857
Stevenson, Fort	Stevens	101 28	47 35	1, 734
Tobacco Garden	Buford	103 36	48 05	.....
Totten, Fort	Benson	99 02	47 59	1, 480
Valley City	Barnes	97 59	46 55	1, 218
Wahpeton	Richland	96 38	46 15	.....
Wild Rice	Cass	96 49	46 33	.....
Willow City	Bottineau	100 15	48 35	.....
Woodbridge	Cavalier	98 55	49 59	.....
Yates, Fort	Emmons	100 35	46 09	.....

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Chronological list of stations, etc.—Continued.

NORTH DAKOTA—Continued.

Station.	Record.						Authority.
	Rainfall.			Temperature.			
	From—	To (inclu- sive)—	Character.	From—	To (inclu- sive)—	Character.	
Abercrombie, Fort.....	Aug., 1860	Oct., 1877	Broken....	Feb., 1859	Oct., 1877	Broken....	U. S. P. H.
Abraham Lincoln, Fort..	July, 1873	July, 1891	do.....	July, 1873	July, 1891	do.....	U. S. P. H.
Bathgate.....	Oct., 1891	Dec., 1891	Complete..	Oct., 1891	Dec., 1891	Complete..	V. O.
Berthold, Fort.....	Sept., 1866	May, 1867	Broken....	Sept., 1866	May, 1867	do.....	U. S. P. H.
Bismarck.....	Sept., 1874	Dec., 1891	Complete..	Oct., 1874	Dec., 1891	do.....	W. B.
Buford, Fort.....	Sept., 1866	do.....	Broken....	Sept., 1866	do.....	Broken....	W. B., U. S. P. H.
Carrington.....	Mar., 1889	Nov., 1891	do.....	Mar., 1889	do.....	do.....	V. O.
Church's Ferry.....	June, 1891	Aug., 1891	Complete..	June, 1891	Aug., 1891	Complete..	V. O.
Davenport.....	Apr., 1888	do.....	Broken....	Apr., 1888	do.....	Broken....	V. O.
Devils Lake.....	do.....	do.....	do.....	Jan., 1884	Apr., 1884	Complete..	V. O.
Dickinson.....	Nov., 1891	Nov., 1891	Complete..	Nov., 1891	Dec., 1891	do.....	V. O.
Ellendale.....	Dec., 1890	Dec., 1891	Broken....	Dec., 1890	do.....	do.....	V. O.
Fargo.....	Dec., 1872	do.....	do.....	July, 1872	do.....	Broken....	V. O.
Farmington.....	June, 1888	June, 1888	Complete..	do.....	do.....	do.....	V. O.
Gallatin.....	Dec., 1889	Dec., 1891	do.....	Feb., 1888	Dec., 1890	Broken....	V. O.
Grafton.....	Jan., 1891	Nov., 1891	Broken....	Jan., 1891	Dec., 1891	do.....	V. O.
Grand Forks.....	June, 1887	Dec., 1891	do.....	June, 1887	do.....	do.....	V. O.
Grand Rapids.....	July, 1891	do.....	Complete..	July, 1891	do.....	Complete..	V. O.
Hope.....	June, 1891	Nov., 1891	do.....	June, 1891	Nov., 1891	do.....	V. O.
Jamestown.....	do.....	Dec., 1891	Broken....	do.....	do.....	do.....	V. O.
Kelso.....	July, 1890	Oct., 1891	Complete..	July, 1890	Dec., 1891	Complete..	V. O.
Lakota.....	June, 1891	do.....	do.....	June, 1891	do.....	Broken....	V. O.
Leech Farm.....	Apr., 1888	Dec., 1889	do.....	Apr., 1888	Dec., 1889	Complete..	V. O.
Mandan.....	Aug., 1883	Mar., 1884	do.....	do.....	do.....	do.....	V. O.
Milton.....	Dec., 1891	Dec., 1891	do.....	do.....	do.....	do.....	V. O.
Minot.....	do.....	do.....	do.....	Nov., 1891	Dec., 1891	Complete..	V. O.
Napoleon.....	June, 1889	Dec., 1891	Broken....	June, 1889	do.....	Broken....	V. O.
New England City.....	July, 1888	Mar., 1891	Complete..	July, 1888	Mar., 1891	Complete..	V. O.
Pembina.....	Nov., 1872	Aug., 1880	do.....	Nov., 1872	Aug., 1880	do.....	W. B.
Pembina, Fort.....	Aug., 1871	Dec., 1891	Broken....	Aug., 1871	Dec., 1891	Broken....	U. S. P. H.
Power.....	June, 1891	do.....	Complete..	June, 1891	do.....	do.....	V. O.
Ransom, Fort.....	Dec., 1868	July, 1872	do.....	Dec., 1868	July, 1872	Complete..	U. S. P. H.
Rice, Fort.....	July, 1868	Dec., 1878	Broken....	July, 1868	Oct., 1878	do.....	U. S. P. H.
Richardton.....	Feb., 1884	July, 1888	do.....	Feb., 1884	July, 1888	Broken....	V. O.
St. Johns.....	Sept., 1891	Dec., 1891	Complete..	Sept., 1891	Dec., 1891	Complete..	V. O.
St. Thomas.....	July, 1891	do.....	do.....	July, 1891	do.....	do.....	V. O.
Sauborn.....	Mar., 1890	Mar., 1890	do.....	Mar., 1890	Mar., 1890	do.....	V. O.
Seward, Fort.....	Jan., 1873	Sept., 1877	Broken....	Jan., 1873	Sept., 1877	do.....	U. S. P. H.
Sheyenne.....	do.....	do.....	do.....	June, 1872	Aug., 1872	do.....	V. O.
Spiritwood.....	Feb., 1881	May, 1881	Complete..	Feb., 1881	May, 1881	do.....	V. O.
Steele.....	Apr., 1889	Oct., 1891	Broken....	Apr., 1889	Oct., 1891	do.....	V. O.
Stevenson, Fort.....	Aug., 1867	May, 1883	do.....	Aug., 1867	Apr., 1883	Broken....	W. B., U. S. P. H.
Tobacco Garden.....	do.....	do.....	do.....	do.....	do.....	do.....	H.
Totten, Fort.....	Aug., 1869	Nov., 1890	Complete..	Feb., 1882	June, 1883	do.....	W. B.
Valley City.....	Sept., 1891	Nov., 1891	do.....	Aug., 1869	Nov., 1890	do.....	W. B., U. S. P. H.
Wahpeton.....	July, 1889	Dec., 1891	Broken....	Sept., 1891	Dec., 1891	Complete..	V. O.
Wild Rice.....	June, 1890	do.....	Complete..	July, 1889	do.....	do.....	V. O.
Willow City.....	June, 1891	do.....	do.....	June, 1890	do.....	do.....	V. O.
Woodbridge.....	Oct., 1891	do.....	do.....	Sept., 1891	do.....	do.....	V. O.
Yates, Fort.....	Jan., 1882	do.....	do.....	Oct., 1891	do.....	do.....	V. O.
				Jan., 1882	do.....	do.....	W. B., U. S. P. H.

Chronological list of stations, etc.—Continued.

SOUTH DAKOTA.

Station.	County.	Longi- tude.	Lati- tude.	Eleva- tion above sea level.
		° '	° '	Feet.
Aberdeen	Brown	98 28	45 28	-----
Alexandria	Hanson	97 45	43 40	-----
Armour	Douglas	98 20	43 25	-----
Bangor	Walworth	100 02	45 26	-----
Bennett, Fort	Stanley	100 39	44 43	1, 440
Bon Homme	Bon Homme	97 40	42 54	-----
Britton	Marshall	97 44	45 47	-----
Brookings	Brookings	96 48	44 19	1, 636
Canton	Lincoln	96 31	43 19	1, 291
Castlewood	Hamlin	97 00	44 43	-----
Clark	Clark	97 41	44 52	-----
Cross	Pennington	103 30	43 55	-----
Dakota City	Hutchinson	97 12	43 21	-----
Dakota, Fort	Lincoln	96 45	43 30	-----
Deadwood	Lawrence	103 43	44 23	4, 630
De Smet	Kingsbury	97 29	44 24	1, 726
Egeland	Day	97 18	45 13	-----
Elkton	Brookings	96 28	44 15	-----
Firesteel	Aurora	98 23	43 50	-----
Flandreau	Moody	96 30	44 03	1, 550
Forestburg	Sanborn	98 04	44 01	-----
Forest City	Potter	100 15	45 01	-----
Frankfort	Spink	98 14	44 52	1, 296
Garden City	Clark	97 34	44 57	-----
Gary	Deuel	96 27	44 48	1, 484
Goddard	Sully	100 06	44 35	-----
Grand View	Douglas	98 19	43 24	-----
Greenwood, Fort	Yankton	97 57	42 54	1, 900
Hale, Fort	Lynan	99 22	43 58	-----
Henry	Codington	97 26	44 52	1, 810
Higmore	Hyde	99 27	44 31	-----
Howard	Miner	97 30	44 00	-----
Hurley	Turner	97 05	43 18	1, 272
Huron	Beadle	98 09	44 21	1, 285
Kimball	Brule	98 57	43 45	-----
Lead City	Lawrence	103 45	44 22	-----
Long Creek	Lincoln	96 50	43 15	-----
Lower Brule Agency	Lyman	99 22	43 59	-----
Mammoth Springs	Pennington	103 16	44 08	-----
Meade, Fort	Lawrence	103 24	44 24	-----
Millbank	Grant	96 36	45 12	1, 149
Mitchell	Davidson	97 58	43 43	-----
Morrison	Hanson	97 53	43 40	-----
Mouth Cherry	Stanley	100 24	44 26	-----
Oelrichs	Fall River	103 08	43 07	-----
Olivet	Hutchinson	97 38	43 17	-----
Onida	Sully	100 02	44 42	-----
Parker	Turner	97 10	43 25	1, 340
Parkston	Hutchinson	97 58	43 24	-----
Pierre	Hughes	100 16	44 31	1, 438
Pierre, Fort	Stanley	100 21	44 24	1, 456
Plankinton	Aurora	98 27	43 43	-----
Randall, Fort	Todd	98 32	43 03	1, 245
Rapid City	Pennington	103 14	44 01	-----
Redfield	Spink	98 30	44 52	-----
Roscoe	Edmunds	99 20	45 28	-----
St. Lawrence	Hand	98 53	44 31	-----
Seranton	Walworth	100 18	45 28	-----
Sioux Falls	Minnehaha	96 39	43 34	1, 500
Sisseton, Fort	Marshall	97 32	45 38	-----
Smithville	Lawrence	102 24	44 13	-----
Spearfish	do	103 51	44 29	-----
Spring Lake	Kingsbury	97 12	44 12	-----
Sully, Fort	Sully	100 36	44 39	1, 688
Swan Lake	Turner	97 04	43 13	-----
Tyndall	Bon Homme	97 47	43 00	-----
Vermillion	Clay	96 03	42 48	1, 161
Watertown	Codington	97 03	44 53	1, 735

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Chronological list of stations, etc.—Continued.

SOUTH DAKOTA—Continued.

Station.	County.	Longi- tude.	Lati- tude.	Eleva- tion above sea level.
		° /	° /	<i>Feet.</i>
Webster.....	Day.....	97 30	45 22	.....
Wentworth.....	Lake.....	96 57	44 00	.....
Wessington Springs.....	Jerauld.....	98 32	44 06	.....
Wicklow.....	Lake.....	96 57	43 57	.....
Wolsey.....	Beadle.....	98 27	44 25	.....
Woonsocket.....	Sanborn.....	98 15	44 05	.....
Yankton.....	Yankton.....	97 20	42 52	1, 228

Station.	Record.						Authority.
	Rainfall.			Temperature.			
	From—	To (inclusive)—	Character.	From—	To (inclusive)—	Character.	
Aberdeen.....	Mar., 1890	Dec., 1891	Complete	Mar., 1890	Dec., 1891	Complete	V. O.
Alexandria.....	Mar., 1882	do.....	Broken	Mar., 1882	do.....	Broken	V. O.
Armour.....	May, 1889	Aug., 1889	Complete	May, 1889	Aug., 1889	Complete	V. O.
Bangor.....	June, 1891	June, 1891	do.....	do.....	do.....	do.....	V. O.
Bennett, Fort.....	Oct., 1880	Oct., 1891	Broken	Oct., 1880	Oct., 1891	Broken	W. B., U. S. P. H.
Bon Homme.....	Mar., 1872	May, 1872	Complete	do.....	do.....	do.....	V. O.
Britton.....	Sept., 1891	Dec., 1891	do.....	Sept., 1891	Dec., 1891	Complete	V. O.
Brookings.....	July, 1888	do.....	Broken	July, 1888	do.....	do.....	V. O.
Canton.....	July, 1889	June, 1891	do.....	Aug., 1889	June, 1891	do.....	V. O.
Castlewood.....	Aug., 1891	Dec., 1891	Complete	Aug., 1891	Dec., 1891	do.....	V. O.
Clark.....	July, 1889	do.....	Broken	July, 1889	do.....	do.....	V. O.
Cross.....	Mar., 1890	do.....	do.....	Mar., 1890	do.....	Broken	V. O.
Dakota City.....	do.....	do.....	do.....	May, 1886	May, 1886	Complete	V. O.
Dakota, Fort.....	July, 1866	June, 1869	Broken	Sept., 1866	Apr., 1869	Broken	U. S. P. II.
Deadwood.....	Jan., 1878	Dec., 1887	do.....	Jan., 1878	Dec., 1887	do.....	W. B.
De Smet.....	Feb., 1889	Dec., 1891	Complete	Feb., 1889	Dec., 1891	Complete	V. O.
Egeland.....	May, 1891	June, 1891	do.....	May, 1891	June, 1891	do.....	V. O.
Elkton.....	Jan., 1891	Dec., 1891	do.....	Jan., 1891	Dec., 1891	Broken	V. O.
Firesteel.....	Feb., 1875	June, 1877	do.....	do.....	do.....	do.....	V. O.
Flandreau.....	Jan., 1890	Dec., 1891	do.....	June, 1890	Dec., 1891	Broken	V. O.
Forestburg.....	May, 1891	do.....	do.....	May, 1891	do.....	Complete	V. O.
Forest City.....	July, 1891	Nov., 1891	do.....	July, 1891	Nov., 1891	do.....	V. O.
Frankfort.....	Sept., 1891	Dec., 1891	do.....	Sept., 1891	Dec., 1891	do.....	V. O.
Garden City.....	Oct., 1887	May, 1889	do.....	Oct., 1887	May, 1889	do.....	V. O.
Gary.....	July, 1891	Dec., 1891	do.....	Aug., 1891	Dec., 1891	do.....	V. O.
Goddard.....	June, 1888	Aug., 1888	Broken	Nov., 1888	Feb., 1889	do.....	V. O.
Grand View.....	Oct., 1888	Dec., 1888	Complete	Oct., 1888	Dec., 1888	do.....	V. O.
Greenwood, Fort.....	Feb., 1860	May, 1861	Broken	Nov., 1859	Dec., 1862	Broken	U. S. P. H.
Hale, Fort.....	Jan., 1879	May, 1884	Complete	Jan., 1879	May, 1884	Complete	U. S. P. H.
Henry.....	Oct., 1886	Sept., 1887	do.....	Oct., 1886	Sept., 1887	do.....	V. O.
Highmore.....	Feb., 1887	Aug., 1891	Broken	Feb., 1887	Apr., 1891	Broken	V. O.
Howard.....	Sept., 1890	Dec., 1891	do.....	Aug., 1890	Dec., 1891	do.....	V. O.
Hurley.....	do.....	do.....	do.....	Jan., 1888	do.....	do.....	V. O.
Huron.....	July, 1881	Dec., 1891	Complete	July, 1881	Dec., 1891	Complete	W. B.
Kimball.....	Apr., 1886	do.....	do.....	Jan., 1889	do.....	do.....	V. O.
Lead City.....	July, 1878	Oct., 1878	do.....	June, 1878	Oct., 1878	do.....	W. B.
Long Creek.....	do.....	do.....	do.....	May, 1888	Sept., 1888	do.....	V. O.
Lower Brule Agency.....	Sept., 1875	Dec., 1878	Broken	Sept., 1875	Dec., 1878	do.....	U. S. P. H.
Mammoth Springs.....	Sept., 1883	Mar., 1884	Complete	Sept., 1883	Mar., 1884	do.....	V. O.
Meade, Fort.....	July, 1879	Dec., 1891	Broken	July, 1879	Dec., 1891	Broken	W. B., U. S. P. H.
Millbank.....	Dec., 1889	do.....	do.....	Apr., 1890	do.....	Complete	V. O.
Mitchell.....	June, 1891	do.....	Complete	July, 1891	do.....	do.....	V. O.
Morrison.....	Jan., 1877	July, 1884	Broken	Dec., 1878	July, 1884	Broken	V. O.
Mouth Cherry.....	Apr., 1861	May, 1861	Complete	do.....	do.....	do.....	V. O.
Oelrichs.....	Mar., 1890	Dec., 1891	Broken	Mar., 1890	Dec., 1891	Broken	V. O.
Olivet.....	June, 1877	Nov., 1882	Complete	June, 1877	Dec., 1882	Complete	V. O.
Ouida.....	Apr., 1889	Dec., 1891	Broken	Mar., 1889	Dec., 1891	Broken	V. O.
Parker.....	July, 1891	Nov., 1881	do.....	July, 1891	do.....	do.....	V. O.

Geographical List of Stations.



CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Chronological list of stations, etc.—Continued.

SOUTH DAKOTA—Continued.

Station.	Record.						Authority.
	Rainfall.			Temperature.			
	From—	To (inclusive)—	Character.	From—	To (inclusive)—	Character.	
Parkston	Feb., 1877	Dec., 1891	Broken	Jan., 1887	Dec., 1891	Broken	V. O.
Pierre	Jan., 1891	do	Complete	July, 1891	do	Complete	W. B.
Pierre, Fort	July, 1855	Apr., 1857	do	Jan., 1854	May, 1857	Broken	U. S. P. H.
Plankinton	May, 1891	Aug., 1891	do	June, 1891	Aug., 1891	Complete	V. O.
Randall, Fort	Jan., 1857	Dec., 1891	Broken	Nov., 1856	Dec., 1891	Broken	U. S. P. H.
Rapid City	Feb., 1881	do	do	Mar., 1881	do	do	W. B.
Redfield	Apr., 1889	June, 1889	Complete	Apr., 1889	June, 1889	Complete	V. O.
Roscoe	May, 1889	Sept., 1889	do	May, 1889	Oct., 1889	do	V. O.
St. Lawrence	Aug., 1890	Dec., 1891	Broken	Aug., 1890	Dec., 1891	Broken	V. O.
Scranton	Dec., 1889	Apr., 1891	Complete	Dec., 1889	Apr., 1891	do	V. O.
Sioux Falls	June, 1890	Dec., 1891	Broken	June, 1890	Dec., 1891	do	V. O.
Sisseton, Fort	Sept., 1866	Apr., 1889	do	Sept., 1866	Apr., 1889	do	U. S. P. H.
Smithville	Jan., 1889	Dec., 1891	Complete	June, 1881	June, 1883	do	W. B.
Speartish	Jan., 1889	Dec., 1891	Complete	Jan., 1889	Dec., 1891	Complete	V. O.
Spring Lake	Oct., 1888	Aug., 1889	do	Nov., 1888	Aug., 1889	do	V. O.
Sully, Fort	Apr., 1866	Dec., 1891	Broken	Jan., 1866	Dec., 1891	Broken	W. B., U. S. P. H.
Swan Lake	Jan., 1881	Sept., 1881	Complete .....	.....	.....	.....	V. O.
Tyndall	July, 1891	Dec., 1891	do	Aug., 1891	Dec., 1891	Complete	V. O.
Vermillion	Dec., 1883	Feb., 1891	Broken	Jan., 1884	Feb., 1891	Broken	V. O.
Watertown	Nov., 1891	Dec., 1891	Complete .....	.....	.....	.....	V. O.
Webster	June, 1882	do	Broken	June, 1882	Dec., 1891	Broken	V. O.
Wentworth	Sept., 1883	do	do	Sept., 1883	do	do	V. O.
Wessington Springs	July, 1891	do	Complete	July, 1891	do	Complete	V. O.
Wicklow	June, 1882	Apr., 1883	Broken	July, 1882	Apr., 1883	Broken	V. O.
Wolsey	Jan., 1889	Dec., 1891	Complete	Jan., 1889	Dec., 1891	Complete	V. O.
Woonsocket	Apr., 1888	Dec., 1890	do	Apr., 1888	Dec., 1890	do	V. O.
Yankton	June, 1862	Dec., 1891	Broken	Nov., 1859	Dec., 1891	Broken	V. O., W. B.

MINNESOTA, NEBRASKA, AND IOWA.

Station.	County.	Longi- tude.	Lati- tude.	Eleva- tion above sea level.
		° /	° /	Feet.
Hay Springs, Nebr	Sheridan	102 37	42 40	-----
Robinson, Fort, Nebr	Dawes	103 23	42 40	-----
Sioux City, Iowa	Woodbury	96 24	42 30	1,258
Valentine, Nebr	Cherry	100 27	42 52	2,613
Moorhead, Minn	Clay	96 44	46 52	935
St. Vincent, Minn	Kittson	97 14	48 56	805

Station	Record.						Authority.
	Rainfall.			Temperature.			
	From—	To (inclusive)—	Character.	From—	To (inclusive)—	Character.	
Hay Springs, Nebr.	Jan., 1886	Dec., 1891	Complete	Jan., 1886	Dec., 1891	Complete	V. O.
Robinson, Fort, Nebr	July, 1883	do	Broken	July, 1883	Nov., 1891	Broken	W. B., U. S. P. H.
Sioux City, Iowa	Sept., 1857	do	do	Aug., 1857	Dec., 1891	do	V. O., W. B., U. S. P. H.
Valentine, Nebr	Sept., 1885	do	Complete	Sept., 1886	do	Complete	W. B.
Moorhead, Minn	Jan., 1881	do	do	Jan., 1881	do	do	V. O., W. B.
St. Vincent, Minn	Sept., 1880	do	do	Sept., 1880	do	do	W. B.

APPENDIX No. 4.

Monthly and annual precipitation, in inches, at stations in North Dakota.

[References: An asterisk (*) indicates incomplete record, but to what extent not accurately known; [], interpolated values. Letters of the alphabet indicate the number of days missing from the record; T, trace of rainfall, or an amount too small to measure.]

FORT ABERCROMBIE, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1860								*0.59	2.09	2.81	2.36	0.94	
1861	0.50	0.32	0.56	3.95	6.67	1.85	1.66	4.78	0.33	0.63	1.79	0.30	23.34
1862	0.70	0.90	0.78	1.82	1.61	0.95	1.68	0.29	1.12	0.36	0.35	0.82	11.38
1863	0.15	0.74	0.39	0.04	0.87	0.26	0.79	4.62	1.38	3.29	0.26	0.61	13.40
1864	0.18	0.14	0.94	0.45	0.38	1.72	7.24	1.75	1.60	1.16	0.25	1.04	16.85
1865	0.24	2.08	2.00	4.20	0.83	1.46	1.61	3.30	0.60	1.10	0.02	0.08	17.52
1866	0.93	0.02	0.62	3.72	0.20	2.00	0.54	1.35	0.92	0.99	1.24	0.01	12.54
1867	0.95	0.45	1.95	0.45	2.14	6.83	3.70	0.76	0.50	0.03	0.60	1.30	19.66
1868	1.30	0.60	1.28	0.83	2.48	3.05	4.25	1.38	3.09	T	0.27	0.94	19.47
1869	0.10	0.50	0.86	2.16	4.32	1.02	0.50	6.10	5.92	0.10	0.70	0.15	22.73
1870	0.30	0.38	1.48	0.32	4.04	2.01	2.70	2.80	5.10	1.10	1.00	0.14	21.37
1871	0.60	0.72	1.40	1.36	0.30	4.10	1.62	0.56	1.40	0.62	0.70	1.82	15.20
1872	*0.40	*0.40	1.50	1.50	4.20	10.15	3.45	2.35	0.90	2.20	0.22	0.55	*27.82
1873	0.50	0.51	0.69	2.00	2.20	3.65	0.92	4.03	0.44	0.26	*0.14		
1874		0.80	0.39	*0.70	1.70	8.16	1.29	4.33	0.76	0.60			
1875	T			*0.43	3.17	2.96	0.32	2.12	1.80	*1.80	0.50	0.90	
1876	0.80	0.08	0.66	0.74	0.56	0.50	1.10	1.95	0.45	0.10	0.70	0.95	8.59
1877	0.20	0.10	0.60	1.70	2.06		4.45	0.30	4.40	*0.40			
Means	0.49	0.55	1.01	1.55	2.22	3.17	2.22	2.43	1.82	0.98	0.69	0.70	17.83

FORT ABRAHAM LINCOLN, N. DAK.

1873							0.80	1.40	0.24	T	T		
1874	0.30	0.00	0.13	0.10	0.45	1.42	0.05	1.23	0.09	0.17	1.60	0.02	5.56
1875	0.08	0.32	0.21	1.95	1.20	3.04	0.97	1.23	0.43	0.86	0.06	T	10.35
1876	0.12	0.34	0.34	1.54	4.28	0.34	0.49	4.83	1.40	0.20	0.56	0.64	15.08
1877	0.46	0.33	3.63	4.42	4.33	5.42	2.44	1.20	T	2.35	*0.50	1.70	*26.78
1878	T	1.20	0.90	2.15	1.30	1.18	0.57	0.60	0.40	0.51	T	0.30	9.11
1879	0.14	0.24	0.07		3.60	4.40	1.65	0.88	T	1.40	0.04	1.04	
1880	T	T	T	1.75	1.52	1.54	0.95	5.63	1.10	T	0.70	T	13.19
1881	T	1.00	0.40	0.60	3.60	2.27	1.00	2.00	2.25	0.10	0.50	T	13.72
1882	T	0.10	1.30	6.40	2.80	3.30	4.60	0.42	1.68	1.26	0.90	0.90	23.66
1883	1.10	1.92	0.70	2.40	1.70	3.42	2.00	1.22	0.20	2.88	0.30	2.00	19.84
1884	1.00	0.68	0.72	1.88	2.00	5.16	3.80	4.18	2.30	1.20	0.80	1.60	25.32
1885	1.00	0.80	0.90	4.00	1.34	3.20	2.82	2.52	0.22	0.70	0.40	0.50	18.40
1886	0.94	0.70	0.88	1.44	1.70	2.20	1.40	1.90	0.38	0.80	0.40	1.20	13.94
1887	1.18	0.40	0.90	1.24	0.80	1.20	5.30	1.84	1.68	1.10	0.75	0.90	17.29
1888	0.90	0.98	0.50	2.04	0.64	5.96	3.32	0.58	0.20	0.25		0.10	
1889	0.10	0.45	0.70	0.00	3.61	2.08	1.45	0.65	0.54	0.00	0.08	0.60	10.26
1890	0.10	0.10	0.30	0.85	0.89	10.93	1.48	0.86	0.85	1.40	0.07	0.28	18.11
1891	0.05	0.43	0.67		2.85	4.85	*4.42						
Means	0.41	0.55	0.74	2.05	2.14	3.44	2.08	1.84	0.77	0.84	0.48	0.69	16.03

BATHGATE, N. DAK.

1891										1.72	0.40	0.70	
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual precipitation, in inches, at stations in North Dakota—Continued.

FORT BERTHOLD, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1866									0.40	0.54	0.00	9.01	
1867				0.16	1.40								

BISMARCK, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1874									0.64	0.83	2.18	0.37	
1875	1.13	1.32	2.06	4.22	3.40	5.02	1.54	2.89	1.85	2.37	1.33	0.39	27.52
1876	0.78	1.45	3.27	2.77	5.71	1.24	1.48	6.55	5.61	0.30	0.86	0.87	30.92
1877	1.64	0.19	0.77	1.32	4.15	4.60	2.52	0.35	0.11	0.94	0.40	0.69	17.68
1878	T	0.26	1.46	5.71	3.15	2.78	1.17	2.79	0.67	1.45	0.21	0.58	20.23
1879	0.15	0.82	0.58	2.60	3.67	4.97	4.27	2.69	0.07	1.35	0.16	1.28	22.61
1880	0.30	0.16	0.69	3.65	2.76	2.32	2.02	4.82	0.72	0.27	0.87	1.17	19.75
1881	0.69	0.78	0.45	1.02	2.27	4.11	1.28	2.98	1.26	0.51	0.35	0.06	15.76
1882	0.23	0.30	1.22	3.56	3.46	3.88	4.31	0.30	1.74	1.44	0.46	0.43	21.33
1883	0.25	0.66	0.38	1.57	1.15	3.84	1.32	0.98	0.04	3.88	0.26	1.33	15.66
1884	0.38	0.87	0.60	2.20	2.56	3.63	3.62	3.80	2.34	0.92	0.73	1.71	23.36
1885	0.31	0.36	0.18	3.21	0.92	2.39	2.41	1.62	0.14	0.54	0.66	0.34	13.08
1886	0.62	0.54	0.94	1.49	1.73	2.03	1.43	1.45	0.38	0.65	1.24	0.76	13.26
1887	0.95	0.52	0.78	1.52	2.19	0.85	4.49	1.62	1.35	1.15	0.11	0.80	16.33
1888	0.96	0.44	0.87	0.11	0.70	5.77	3.96	1.73	0.33	1.02	0.38	0.24	16.51
1889	0.50	1.48	0.55	0.26	3.35	1.03	2.01	0.53	0.48	T	0.15	0.69	11.03
1890	0.80	0.27	0.49	0.68	0.57	8.40	1.14	0.69	0.98	1.37	0.14	0.22	15.75
1891	0.05	0.57	1.24	2.40	2.92	4.19	4.20	1.45	0.87	0.99	1.20	0.44	20.50
Means	0.57	0.65	0.97	2.25	2.63	3.59	2.54	2.19	1.09	1.11	0.62	0.69	18.90

FORT BUFORD, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1866									0.20	0.30		T	
1867		0.70	0.08	0.06	0.42	1.27		0.54	0.10	0.46	0.58	1.13	
1868	0.26	0.12	0.02	0.33	1.79	3.21	1.97	2.39	0.27	0.62	0.13	0.39	11.50
1869	T	0.98	0.46	0.65	1.78	0.86	1.62	0.94	2.17	T	0.55	T	9.41
1870	0.32	1.03	0.31	0.00	3.92	0.77	0.76	0.81	0.45	1.25	0.03	0.25	*9.90
1871	0.21	0.19	0.24	0.45	2.43	0.90	0.55	0.10	T	0.72	1.00	1.40	8.19
1872	1.35	0.00	1.48	1.55	1.12	1.75	2.44	0.45	3.25	0.80	1.04	*1.57	*16.80
1873	0.98	4.35	2.25	1.25	6.60	2.69	T	0.40	1.10	0.45	T	T	
1874	0.15	0.20	0.25	0.15	1.80	1.02	0.21	2.26	0.25	0.13	0.83	0.30	7.58
1875	0.71	1.12	0.73	1.83	1.39	3.46	1.48	3.05	0.43	0.45	0.20	0.00	14.85
1876	0.13	0.12	0.09	0.10	4.00	1.75	0.00	3.95	1.05	0.80	0.22	0.13	12.34
1877	0.31	0.00	0.11	0.13	4.50	2.04	0.80	0.00	0.85	1.60	1.75	0.20	12.29
1878	0.00	0.05	1.60	1.85	2.60	3.15		1.00	1.35	2.05	T	1.26	
1879	0.02	0.59	0.03	2.75	5.56	3.35	3.63	0.18	0.00	1.55	0.37	1.64	19.67
1880	0.10	0.51	0.21	0.74	4.02	5.46	4.17	2.36	1.04	0.90	0.66	3.08	23.25
1881	1.98	1.10	1.17	1.34	1.00	3.44	1.32	1.10	1.58	0.39	0.39	0.09	14.90
1882	0.26	0.29	0.69	0.94	1.61	1.87	2.25	0.16	2.86	1.00	0.29	0.51	12.73
1883	1.98	0.36	0.91	0.48	0.59	0.97	1.69	1.96	0.22	1.41	0.14	0.11	10.82
1884	0.11	0.12	0.10	1.30	0.14	0.99	1.87	1.06	0.53	0.44	0.31	0.40	7.37
1885	0.64	0.44	0.03	1.71	1.02	6.05	3.02	1.50	0.26	0.19	0.56	0.14	15.56
1886	0.41	0.71	0.31	2.25	1.44	0.93	0.56	0.87	0.05	1.57	0.59	0.55	10.21
1887	0.51	0.18	0.12	1.09	1.59	3.25	2.00	3.91	1.07	1.43	0.10	0.18	15.43
1888	0.47	0.33	0.11	0.61	0.96	6.75	2.12	1.65	0.62	0.62	0.10	0.07	14.74
1889	0.13	0.30	0.20	0.60	2.69	1.03	0.63	0.95	1.13	0.01	0.37	0.42	8.46
1890	0.22	0.18	0.58	0.60	1.58	5.23	1.06	0.22	2.05	2.45	0.03	0.04	14.21
1891	0.19	0.14	0.27	1.84	1.49	7.08	2.99	0.78	0.66	1.96	1.44	0.14	18.98
Means	0.48	0.54	0.51	0.98	2.24	2.78	1.62	1.30	0.91	0.91	0.48	0.54	13.29

CARRINGTON, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1889			0.17	1.07	1.93	1.92	3.03	2.37					
1891						3.64	4.32	0.30	1.19	1.77	0.67		
Means						2.78	3.68	1.34					

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual precipitation, in inches, at stations in North Dakota—Continued.

CHURCH'S FERRY, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891						5.15	2.66	0.88	-----	-----	-----	-----	-----

DAVENPORT, N. DAK.

1888				1.06	1.82	2.04	3.04	1.24	0.52	1.04	0.06	0.05	-----
1889	0.58	0.65	0.05	1.23	1.68	0.84	1.50	2.44	5.09	0.02	0.19	0.70	14.97
1890	0.43	0.30	0.38	0.10	1.47	5.75	3.04	3.25	2.73	2.20	-----	-----	-----
1891					0.89	5.19	6.52	1.51	-----	-----	-----	-----	-----
Means	0.50	0.48	0.22	0.80	1.46	3.46	3.52	2.11	2.78	1.09	0.12	0.38	16.92

DICKINSON, N. DAK.

1891											0.50	-----	-----
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ELLENDALE, N. DAK.

1890												*0.06	-----
1891			2.48	2.94	2.06	3.87	5.12	0.41	0.78	1.29	0.34	0.70	-----
Means												0.38	-----

FARGO, N. DAK.

1872												0.25	-----
1891						3.83	3.64	2.96	2.69	1.32	0.46	0.43	-----
Means												0.34	-----

FARMINGTON, N. DAK.

1888						3.30	-----	-----	-----	-----	-----	-----	-----
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GALLATIN, N. DAK.

1889												0.03	-----
1890	0.09	0.26	0.21	0.46	1.06	3.51	2.63	2.53	1.89	2.06	0.09	0.06	14.85
1891	0.21	0.42	0.28	1.69	2.21	3.03	4.43	0.88	1.61	2.71	0.66	0.57	18.70
Means	0.15	0.34	0.24	1.08	1.64	3.27	3.53	1.70	1.75	2.38	0.38	0.22	16.68

GRAFTON, N. DAK.

1891	0.34	1.58	-----	-----	2.32	7.13	4.65	2.09	2.23	2.44	0.10	-----	-----
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GRAND FORKS, N. DAK.

1887						5.33	-----						
1888								0.25	1.32	-----	-----	-----	-----
1889	1.22	1.00											
1890				0.34	1.21	3.77	1.48			3.59	0.12	0.13	
1891	0.27	0.95				2.31		1.37	0.71		0.71	1.29	
Means	0.74	0.98				3.80		0.81	1.02		0.42	0.71	

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual precipitation, in inches, at stations in North Dakota—Continued.

GRAND RAPIDS, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891							3.98	0.16	0.94	1.70	1.03	3.32	

HOPE, N. DAK.

1891						3.35	5.06	0.81	1.31	2.27	0.30		
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JAMESTOWN, N. DAK.

1891						6.29						1.42	
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KELSO, N. DAK.

1890							2.51	2.06	1.49	2.60	0.20	0.09	
1891	0.42	0.95	2.17	2.21	1.45	4.85	2.45	0.99	2.01	2.60			
Means							2.48	1.52	1.75	2.60			

LAKOTA, N. DAK.

1891						4.55	2.74	2.00	1.97	2.17			
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LEECH FARM, N. DAK.

1888				1.06	1.82	2.04	3.04	1.24	0.52	1.04	0.06	0.50	
1889	0.75	0.65	0.05	1.23	1.68	0.84	1.50	2.44	*5.09	0.02	0.19	0.70	20.14
Means				1.14	1.75	1.44	2.27	1.84	2.80	0.53	0.12	0.60	

MANDAN, N. DAK.

1883								0.75	0.08	1.81	0.03	0.81	
1884	0.02	0.34	T										

MILTON, N. DAK.

1891												1.00	
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NAPOLEON, N. DAK.

1889					2.45	1.43	2.85	1.74	2.29	T	0.13	0.69	
1890	0.59	0.43	0.10	0.52		7.19	0.46	1.06	1.02	1.44	0.20	0.36	
1891	0.12	0.98	1.11	2.39	2.02	7.87	4.93	1.24	2.17	2.18	1.13	1.76	27.90
Means	0.36	0.70	0.60	1.46	2.24	5.50	2.75	1.35	1.83	1.21	0.49	0.94	19.43

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual precipitation, in inches, at stations in North Dakota—Continued.

NEW ENGLAND CITY, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1888							0.90	1.35	T	0.48	0.05	0.25	
1889	0.50	0.85	0.02	0.84	2.18	0.94	2.58	0.70	0.47	T	0.07	0.40	9.55
1890	0.55	0.18	0.03	1.56	2.35	6.93	1.96	0.04	0.55	1.25	0.18	0.50	16.08
1891	T	0.40	1.00										
Means	0.35	0.48	0.35	1.20	2.26	3.94	1.81	0.70	0.34	0.58	0.10	0.38	12.49

FORT PEMBINA, N. DAK.

1871								2.95	0.23	1.13	0.54	0.47	
1872	0.28	0.25	0.45	2.00	1.90	2.09	3.09	0.82	1.67	1.16	0.53	2.95	17.19
1873	0.41	0.75	0.35	0.39	2.11	2.91	1.30	2.38	2.05	0.56	0.66	0.18	14.05
1874	0.26	0.25	0.35	0.20	1.55	3.41	1.40	2.21	1.54	0.29	0.30	0.12	11.88
1875	*0.04	*0.03	*0.05	0.47	1.87	3.83	1.18	2.62	0.92	1.26	0.70	0.56	*13.53
1876	0.17	0.53	1.09	0.49	6.55	3.43	5.52	6.47	0.54	0.14	0.39	0.43	25.75
1877	0.06	0.10	1.13	0.68	4.15	9.85	1.47	0.51	1.40	0.69	0.55	1.08	21.67
1878	0.12	0.26	4.50	5.78	2.52	3.57	4.57	3.01	1.95	6.61	0.32	0.62	33.83
1879	0.58	0.98	0.94	0.34	1.54	3.90	3.01	0.90	1.18	3.38	0.34	2.22	19.31
1880	0.43	0.20	0.32	0.59	7.98	4.98	4.75	4.34	1.70	1.30	0.00	0.76	27.35
1881	0.56	1.40	0.28	0.70	3.94	3.10	0.40	2.50	2.52	2.66	0.70	0.50	19.26
1882	1.08	0.62	1.78	0.50	2.50	3.34	2.82	0.10	1.30				
1883	0.20		0.50	1.67	1.80	1.26	1.11	2.63	0.58	1.75	0.63	1.72	
1884	0.10	0.80	1.81	1.86	1.25						2.23	2.62	
1885	0.50	0.20	0.75	5.90	1.40	1.95	3.10	1.20	0.10	0.35	0.87	1.05	17.37
1886	2.25	4.59	0.35	2.85	1.55	3.60	3.30	0.25	3.90	1.10	3.80	1.70	29.24
1887	1.60	4.10	1.58	2.80	3.73	3.94	2.98	0.86	0.55	0.13	0.33	0.76	23.36
1888	0.17	0.26	0.98	0.69	0.56	8.41	3.06	0.45	1.10	1.48	0.35	0.48	17.99
1889	0.34	0.48	0.32	0.71	0.10	1.42	1.66	2.34	2.88	0.30	0.18	1.02	11.75
1890	0.54	0.24		1.41	1.07	5.84	2.75	2.39	3.89	3.98	0.29	0.15	
1891	0.88	1.06	1.09	1.56	2.38	6.32	2.69	3.10	2.38	1.93	1.74	0.80	25.93
Means	0.53	0.90	0.98	1.58	2.52	4.06	2.64	2.10	1.62	1.59	0.77	1.01	20.30

POWER, N. DAK.

1891						3.85	4.96	0.14	2.80	1.07	0.60	0.99	
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FORT RANSOM, N. DAK.

1868												0.80	
1869	0.10	0.18	0.77	0.80	2.80	0.79	0.54	5.18	*3.94	T	0.34	0.33	*15.77
1870	1.84	0.58	1.68	0.34	3.60	1.95	0.70	2.11	2.36	1.07	0.18	0.63	17.04
1871	0.43	0.57	1.55	3.26	0.63	2.96	0.30	0.35	0.17	0.34	1.73	1.43	13.72
1872	1.33	0.96	1.10	2.21	2.76	5.49	9.19						
Means	0.92	0.57	1.28	1.65	2.45	2.80	2.68	2.55	2.16	0.47	0.75	0.80	19.08

FORT RICE, N. DAK.

1868							1.98	0.81	0.00		0.50	0.69	
1869	0.04	0.50	0.36	1.49	1.98	1.46	0.54			T	0.68	T	
1870	0.46	0.06	0.72		4.52	0.12	0.72	1.41	1.14	*0.96	T	0.13	
1871	0.29	0.02	0.44	2.92	0.00	3.84	1.10	0.51	T	0.38	0.34	T	9.84
1872	1.50	T	0.61	1.22	2.32	3.73	1.53	1.19	0.40	0.92	0.34	0.34	14.10
1873	0.72	*1.66	0.56	0.10	1.90	2.25	1.79	1.36	1.16	0.80	0.25	T	*12.55
1874	1.76	T	0.35	T	1.10	5.08	0.22	0.69	T	0.75	1.47	0.32	11.71
1875	0.38	1.38	0.41	3.32	4.01	0.42	0.51	1.62	1.23	1.04	0.51	0.18	15.01
1876	0.14	1.30	0.56	0.21	3.75	1.29	0.80	1.19	1.20	T		*0.50	
1877			T		4.25	7.57	3.83	2.59	0.08	1.01	0.71	1.69	
1878	0.19	1.00	2.15	7.28	4.40	3.78	2.18	3.40	3.05	2.65	[0.20]	[0.60]	[30.88]
Means	0.61	0.66	0.62	2.07	2.82	2.95	1.38	1.48	0.83	0.85	0.50	0.40	15.17

Monthly and annual precipitation, in inches, at stations in North Dakota—Continued.

RICHARDSON, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884		0.90	0.35	4.20	1.40	6.00	5.20	6.40	2.50	0.70	0.70	1.50	-----
1885	1.90	0.80	1.00	3.80	3.90	3.80	2.50	2.80	0.10	1.00	1.30	0.50	23.40
1886	1.10	1.20	1.00	2.40		2.80	2.75	1.40		0.80	0.80	0.90	-----
1887	2.00		1.10		3.20	2.26		2.93		1.07	0.60	3.00	-----
1888	4.00	1.87	2.00		0.86	8.23	4.05						-----
Means	2.25	1.19	1.09	3.47	2.31	4.62	3.62	3.38	1.30	0.89	0.85	1.48	26.48

ST. JOHNS, N. DAK.

1891									1.11	1.12	1.44	3.11	-----
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ST. THOMAS, N. DAK.

1891							5.33	2.24	3.01	2.34	0.10	5.50	-----
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SANBORN, N. DAK.

1890			0.62										-----
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FORT SEWARD, N. DAK.

1873	0.34	0.32	0.36	0.26	3.10	3.14	1.93	5.14	0.36	0.28	0.42	0.25	15.90
1874	0.38	0.20	0.39	0.22	3.10	5.83	0.97	9.73	0.81	0.36	0.13	T	15.15
1875	0.01	0.14	0.10	0.30	2.57	m2.65	0.81	3.16	2.07	0.96	0.10	0.16	13.09
1876	0.06	0.16	2.00	2.23	5.15	1.13	2.92	0.80	1.80		T	0.15	-----
1877	0.04	0.04	0.57	0.93	1.97	6.34	2.72	0.43	0.51				-----
Means	0.17	0.17	0.68	0.79	3.18	3.82	1.88	2.45	1.12	0.53	0.16	0.14	15.09

SPIRITWOOD, N. DAK.

1881		0.22	0.81	0.16	2.75								-----
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STEELE, N. DAK.

1889				0.57	3.65	1.28	2.24	0.44		0.06	0.20	0.65	-----
1890	0.65	0.50	1.35	*0.80	1.35	7.93	0.59	0.45	0.34		0.10	0.30	-----
1891			1.52	1.38	3.39	7.40	4.08	0.56	2.05	1.83			-----
Means			1.44	0.92	2.80	5.20	2.30	0.48	1.20	0.94	0.15	0.48	-----

FORT STEVENSON, N. DAK.

1867								0.13	0.03	0.57	0.67	0.97	-----
1868	*0.60	0.20	0.90	0.68	*1.82	1.88	0.97	3.16	0.24	0.08	0.00	0.65	*11.13
1869				T	2.70		1.65	2.42	3.00	4.15	0.09	0.37	-----
1870	0.50	0.02	2.05					0.28	0.20	0.15	1.78	0.79	16.99
1871	0.76	0.80	0.80	3.50	1.58	3.00	3.35	0.28	0.20	0.15	1.78	0.79	14.99
1872	1.15	0.06	0.76	0.77	0.55	1.50	2.49	2.15	3.73	0.82	0.31	0.70	*9.80
1873	0.17	0.55	1.43	0.14	1.26	1.46	1.80	1.95	0.97	T	*0.03	0.04	*7.81
1874	0.02	T	0.42	0.48	*1.15	1.51	0.41	3.19	0.54	0.02	0.10	0.02	14.98
1875	0.14	0.51	0.17	0.26	0.33	2.22	2.15	6.35	1.23	0.60	0.73	0.26	21.86
1876	1.15	1.00	1.96	1.30	4.40	2.24	0.86	5.82	2.20	0.05	0.77	0.11	-----
1877	0.21	0.02	0.71	0.99	4.74		0.11	1.61	1.03	0.45	0.14	0.20	-----

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual precipitation, in inches, at stations in North Dakota—Continued.

FORT STEVENSON, N. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1878	T	0.18	2.74	0.69	0.36	5.00	0.91	-----	1.77	1.58	T	0.40	-----
1879	T	0.92	0.86	2.67	3.35	5.80	3.68	1.00	0.06	1.53	0.06	1.07	21.00
1880	0.27	0.11	0.49	0.66	2.48	2.20	0.83	1.96	1.08	0.36	0.88	0.91	12.23
1881	0.72	0.56	0.14	0.60	2.31	5.83	2.01	3.12	2.10	1.26	1.00	0.18	19.83
1882	0.43	0.54	2.05	3.25	2.49	5.61	4.34	0.21	2.56	2.82	0.74	0.70	25.74
1883	0.41	0.10	0.65	1.44	0.53	-----	-----	-----	-----	-----	-----	-----	-----
Means	0.44	0.37	1.08	1.16	2.00	3.19	1.83	2.38	1.38	0.96	0.49	0.49	15.77

FORT TOTTEN, N. DAK.

1869	-----	-----	-----	-----	-----	-----	-----	2.62	1.18	0.03	0.40	0.00	-----
1870	0.00	0.01	1.00	0.40	5.35	0.59	2.33	0.82	2.04	1.32	1.10	0.24	15.20
1871	1.80	0.74	0.90	1.87	1.04	5.91	0.06	1.95	0.41	0.80	0.93	1.12	17.03
1872	0.74	0.26	3.40	3.15	1.10	1.66	4.00	2.48	0.60	0.78	0.64	0.19	19.00
1873	1.16	1.32	0.87	0.57	3.75	4.68	1.03	2.34	0.70	0.06	0.77	0.05	17.30
1874	0.38	0.03	0.49	0.62	1.43	2.52	0.98	6.34	1.92	0.40	1.41	0.19	16.71
1875	0.51	0.80	0.24	1.54	2.77	6.25	1.62	3.44	2.21	1.66	0.75	0.38	22.17
1876	0.12	0.42	1.52	0.42	3.92	1.10	2.33	2.48	1.08	0.00	0.53	0.48	14.40
1877	0.20	0.00	0.90	0.47	4.41	5.12	5.16	0.00	0.19	0.58	0.51	1.30	18.84
1878	0.00	0.30	3.70	5.19	*2.38	2.90	2.82	0.70	1.10	2.46	0.70	*0.20	*22.45
1879	0.17	0.70	0.10	0.14	3.80	3.90	2.10	3.80	1.30	1.50	0.20	1.44	19.15
1880	*0.40	0.60	0.30	*0.24	*4.38	3.17	2.94	8.80	0.38	*0.55	T	*0.48	*22.24
1881	0.16	1.34	0.28	*0.30	2.05	3.88	0.10	2.24	2.46	*0.24	5.10	T	*18.15
1882	0.48	*0.30	2.04	2.40	1.30	4.30	1.08	0.31	0.35	3.89	1.73	0.40	*18.58
1883	0.92	0.79	0.19	1.71	1.79	1.42	1.84	1.46	0.14	4.10	0.73	2.84	17.93
1884	0.28	0.58	0.68	2.38	1.20	2.50	3.05	3.72	1.32	0.92	0.25	0.48	17.36
1885	0.17	0.25	0.15	3.07	1.70	3.45	5.83	1.91	0.13	0.66	0.90	0.47	18.69
1886	0.91	0.19	0.72	0.85	2.75	2.79	1.29	1.06	0.87	1.16	0.65	0.38	14.22
1887	0.70	0.50	0.56	0.63	1.57	5.57	4.62	2.36	0.59	0.98	0.40	0.87	19.35
1888	0.63	0.09	0.79	0.65	0.60	7.41	3.34	0.90	0.47	0.87	0.27	0.11	16.13
1889	0.23	0.64	0.16	0.78	0.62	1.56	2.05	2.69	1.62	T	0.19	0.00	10.54
1890	0.35	0.60	0.27	1.97	0.79	6.84	1.25	2.37	0.80	4.00	0.00	-----	-----
Means	0.49	0.53	0.92	1.40	2.32	3.69	2.37	2.49	0.99	1.20	0.83	0.55	17.78

VALLEY CITY, N. DAK.

1891	-----	-----	-----	-----	-----	-----	-----	-----	1.20	3.56	0.95	-----	-----
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WAHPETON, N. DAK.

1889	-----	-----	-----	-----	-----	-----	0.94	1.30	1.97	0.00	T	0.18	-----
1890	0.50	-----	0.30	0.72	2.98	5.75	4.84	2.91	3.32	1.73	0.35	0.10	-----
1891	0.05	1.54	1.19	1.73	1.82	5.36	4.49	0.77	2.32	0.93	1.00	1.30	22.50
Means	0.28	-----	0.74	1.22	2.40	5.56	5.14	2.49	3.80	0.89	0.45	0.53	-----

WILD RICE, N. DAK.

1890	-----	-----	-----	-----	-----	7.07	1.41	3.39	2.09	1.84	0.35	0.20	-----
1891	0.35	1.65	1.25	1.68	0.95	3.78	7.66	1.26	2.58	1.26	0.67	0.78	23.87
Means	-----	-----	-----	-----	-----	5.42	4.54	2.32	2.34	1.55	0.51	0.49	-----

WILLOW CITY, N. DAK.

1891	-----	-----	-----	-----	-----	2.41	3.17	1.02	1.55	3.03	1.25	1.10	-----
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

53

Monthly and annual precipitation, in inches, at stations in North Dakota—Continued.

WOODBIDGE, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891										0.83	0.55	0.44	.....

FORT YATES, N. DAK.

1882	0.50	0.10	1.00	2.00	2.04	2.59	2.63	0.07	0.87	0.57	0.12	0.06	12.55
1883	0.82	0.68	0.78	1.59	2.12	1.97	2.25	0.67	0.04	1.08	0.15	1.98	14.13
1884	0.58	1.24	0.23	0.72	0.62	2.75	3.10	3.12	1.56	0.81	0.58	0.63	15.94
1885	0.39	0.73	0.44	1.92	1.78	5.68	2.80	1.10	0.24	0.38	0.34	0.95	16.75
1886	1.12	4.62	1.09	0.89	1.58	2.05	4.70	4.83	0.80	0.50	1.19	0.60	23.97
1887	0.47	0.36	0.35	2.24	2.00	0.57	3.59	1.94	1.31	0.37	0.15	0.87	14.22
1888	0.09	0.16	0.40	0.30	0.80	7.92	3.66	2.32	0.20	0.11	0.08	0.20	16.24
1889	0.87	1.00	0.33	1.14	3.29	1.74	3.99	0.28	0.59	0.10	0.07	0.28	13.68
1890	0.28	0.43	0.22	1.33	0.57	6.84	2.59	1.51	0.68	0.60	0.16	0.39	15.60
1891	0.07	0.81	1.37	3.08	1.34	4.70	2.63	0.42	1.66	1.25	0.95	0.67	18.98
Means	0.52	1.02	0.62	1.52	1.61	3.68	3.19	1.63	0.80	0.58	0.38	0.66	16.21

Monthly and annual precipitation, in inches, at stations in South Dakota.

ABERDEEN, S. DAK.

1890			0.18	0.28	2.04	7.54	1.40	0.85	1.18	1.33	0.40	0.20	.....
1891	0.08	0.55	0.40	2.50	1.65	2.76	1.65	0.63	1.56	1.88	1.30	1.00	15.96
Means			0.29	1.39	1.84	5.15	1.52	0.74	1.37	1.60	0.85	0.60	.....

ALEXANDRIA, S. DAK.

1882			1.38	4.42	1.60	3.86	3.79	2.61	0.67	3.22	0.75	0.45	.....
1883	0.35	1.10	0.86	3.30	5.34	4.55	6.72	3.80	1.68	1.60	0.06	1.18	30.54
1884	0.22	1.04											.....
1889					1.40	1.52	2.15	3.81	6.25			0.80	.....
1890	0.55		1.10	1.54	3.80	4.26	2.38	2.86	2.16	1.00	0.50	0.20	.....
1891	0.01	1.60	2.00	4.26	1.33	6.45	3.05	1.40	0.43			1.72	.....
Means	0.28	1.25	1.34	3.38	2.69	4.13	3.62	2.90	2.24	1.94	0.44	0.87	25.08

ARMOUR, S. DAK.

1889					4.32	3.10	7.03	1.80					
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BANGOR, S. DAK.

1891						4.47							
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FORT BENNETT, S. DAK.

1880										0.15	0.08	0.55	
1881	0.82	1.18	1.57	0.93	4.10	3.07	1.45	2.24	2.74	1.00	0.70	T	19.80
1882	2.01	0.83	1.63	3.04	1.35	4.06	2.29	0.32	1.03	0.69	0.50	0.05	17.80
1883	0.37	0.40	0.64	2.82	2.35	3.99	1.79	1.88	0.30	1.19	T	1.18	16.91
1884	0.31	0.57	1.08	2.35	2.69	3.10	3.79	0.74	0.68	0.96	0.17	0.46	16.90
1885	0.14	0.21	0.13	1.84	2.40	5.62	1.55	5.87	1.47	0.14	0.28		.....
1889		0.43	0.69	2.66	3.50	1.56	5.85	0.68	1.16	0.04	1.40	1.50	.....
1890	0.05	1.30	0.14	0.76	1.53	4.41	1.40	0.71	2.03	0.43	0.59	0.24	13.59
1891	0.04	0.40	0.38	2.27	1.08	1.76	1.70	2.29	1.26	1.63			.....
Means	0.53	0.66	0.78	2.08	2.38	3.45	2.48	1.84	1.33	0.69	0.46	0.57	17.25

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

BON HOMME, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1872			2.13	*2.60	3.30								

BRITTON, S. DAK.

1891									2.04	0.97	0.90	0.73	
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BROOKINGS, S. DAK.

1888							1.61	3.21	0.56	0.62		0.05	
1889	1.05	1.20	0.16	1.02	1.50	1.48	2.92	0.72	2.70	T		0.94	
1890	0.65		0.56	0.79	3.33	7.91	1.54	2.07	0.45	0.31	0.30	0.80	.....
1891	0.10	*1.00	0.60	2.23	0.84	4.09	2.01	1.38	0.48	1.07	0.25	2.30	*16.35
Means	0.60	1.10	0.44	1.35	1.89	4.49	2.02	1.84	1.05	0.50	0.28	1.02	16.58

CANTON, S. DAK.

1889							1.40	3.09	4.53		1.08	1.88	.....
1890	1.65	0.10	2.30	2.12	3.64	3.91	1.68	2.46	0.87	0.73	1.36	0.60	21.42
1891	0.80	1.20	1.20	3.45	2.13	5.82							.....
Means	1.22	0.65	1.75	2.78	2.88	4.86	1.54	2.78	2.70		1.22	1.24	

CASTLEWOOD, S. DAK.

1891								1.92	1.28	0.83	0.55	1.49	
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CLARK, S. DAK.

1889							3.69	T	5.29	0.40	T	0.19	
1890	T	T		0.45	3.10	6.28	1.49	0.88	0.87	0.96	0.22		
1891	0.00	T	1.00	3.74	3.35	3.01	0.99	1.03	1.11	0.96	1.20	0.57	
Means	T	T		2.10	3.22	4.64	2.06	0.64	2.42	0.77	0.47	0.38	.....

CROSS, S. DAK.

1890			1.84	1.41	2.28	2.56		1.29	0.03		0.08		.....
1891		1.27	1.77		2.59	4.53	1.86	3.41	1.57	0.50	0.21	0.25	.....
Means			1.80		2.44	3.54		2.35	0.80		0.14		.....

FORT DAKOTA, S. DAK.

1866							90.75	1.74	4.25	0.12	1.62		.....
1867				0.12	6.00								.....
1868								1.91	2.91	1.26	0.88	0.32	.....
1869	0.03	1.02	0.47	0.56	0.97	00.41							.....
Means				0.34	3.48			1.82	3.58	0.69	1.25		

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

DEADWOOD, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July#	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1878	0.30	1.01	3.85	8.77	7.80	-----	*5.77	*2.61	*2.06	*1.81	*0.75	3.63	-----
1879	0.58	0.72	0.51	7.69	5.03	4.67	1.82	1.19	0.32	4.26	0.27	1.14	28.50
1880	0.56	1.14	0.75	1.57	2.43	3.33	1.51	3.33	0.30	1.27	2.37	0.64	19.20
1881	3.10	1.26	2.59	2.05	3.70	3.04	1.56	0.56	1.80	0.58	0.81	0.05	21.13
1882	0.33	0.21	1.29	7.31	7.05	5.78	4.81	1.97	0.28	0.88	1.35	2.57	33.83
1883	0.74	1.32	0.84	5.69	10.33	5.26	1.82	1.32	0.11	0.80	0.45	1.01	29.69
1884	0.85	1.01	2.61	2.29	1.72	2.51	3.51	3.07	1.99	1.48	1.46	1.79	24.29
1885	1.60	2.88	3.31	3.11	3.22	4.83	1.44	2.92	0.90	1.69	1.40	1.18	28.48
1886	1.28	1.78	2.12	6.72	1.01	2.00	2.45	1.81	1.06	0.96	3.24	1.51	25.97
1887	3.18	0.74	2.01	6.47	4.25	2.16	3.70	3.22	1.75	2.05	0.48	1.65	31.66
Means	1.25	1.21	1.99	5.17	4.65	3.73	2.84	2.23	1.06	1.58	1.26	1.51	28.48

DE SMET, S. DAK.

1889	-----	0.50	0.04	2.36	2.59	1.20	4.80	0.38	2.74	0.10	0.01	1.80	-----
1890	0.45	0.50	0.41	1.14	3.19	5.35	1.25	1.25	0.70	0.32	0.70	0.80	15.86
1891	0.07	1.10	0.80	2.88	0.69	3.81	1.46	0.20	1.49	0.86	1.05	1.37	15.78
Means	0.26	1.05	0.62	2.13	2.16	3.45	2.50	0.61	1.64	0.43	0.59	1.26	16.70

EGELAND, S. DAK.

1891	-----	-----	-----	-----	3.17	4.32	-----	-----	-----	-----	-----	-----	-----
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ELKTON, S. DAK.

1891	0.72	1.35	1.68	2.94	2.11	3.19	1.19	1.50	0.50	1.33	0.22	2.05	18.78
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FIRESTEEL, S. DAK.

1875	-----	0.80	0.50	1.95	4.00	3.95	2.20	3.20	1.50	0.50	0.22	0.15	-----
1876	0.50	0.65	2.20	0.15	3.00	2.40	6.55	2.65	4.70	1.50	0.13	0.50	-----
1877	0.60	0.10	3.35	2.60	4.60	2.40	-----	-----	-----	-----	-----	-----	-----
Means	0.55	0.52	2.02	1.57	3.87	2.92	4.38	2.92	3.10	1.00	0.18	0.32	23.35

FLANDREAU, S. DAK.

1890	0.25	0.15	0.42	1.08	4.85	5.98	3.25	2.06	0.92	0.65	0.53	0.39	20.53
1891	0.12	0.67	1.20	2.82	0.81	4.83	3.05	2.33	0.35	1.48	0.46	2.60	20.72
Means	0.18	0.41	0.81	1.95	2.83	5.40	3.15	2.20	0.64	1.06	0.50	1.50	20.63

FORESTBURG, S. DAK.

1891	-----	-----	-----	-----	0.38	6.31	1.45	2.18	1.02	0.87	0.48	1.07	-----
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FOREST CITY, S. DAK.

1891	-----	-----	-----	-----	-----	-----	7.53	0.57	1.66	1.49	0.75	-----	-----
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

FRANKFORT, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891	-----	-----	-----	-----	-----	-----	-----	-----	0.67	0.69	1.19	1.30	-----

GARDEN CITY, S. DAK.

1887	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.02	0.34	1.25	-----
1888	0.40	0.40	1.79	2.85	2.25	1.10	4.55	2.97	0.60	0.37	0.09	0.15	17.52
1889	0.62	0.53	0.20	1.53	3.01	-----	-----	-----	-----	-----	-----	-----	-----
Means	0.51	0.46	1.00	2.19	2.63	-----	-----	-----	-----	0.70	0.22	0.70	-----

GARY, S. DAK.

1891	-----	-----	-----	-----	-----	-----	1.69	0.72	1.17	0.83	0.45	0.89	-----
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GODDARD, S. DAK.

1888	-----	-----	-----	-----	-----	3.30	-----	1.49	-----	-----	-----	-----	-----
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GRAND VIEW, S. DAK.

1888	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.42	0.15	0.22	-----
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FORT GREENWOOD (YANKTON INDIAN AGENCY), S. DAK.

1860	-----	0.20	-----	3.50	4.40	12.00	-----	-----	-----	-----	-----	1.00	-----
1861	-----	0.25	3.10	8.00	7.40	-----	-----	-----	-----	-----	-----	-----	-----
Means	-----	0.22	-----	5.75	5.90	-----	-----	-----	-----	-----	-----	-----	-----

FORT HALE, S. DAK.

1879	0.14	0.08	0.20	1.50	3.04	4.04	2.54	0.54	0.96	0.80	T	0.82	14.66
1880	0.22	0.60	0.34	0.42	3.68	4.58	0.82	5.46	0.00	1.36	0.06	1.12	18.66
1881	1.50	3.08	1.66	0.60	3.92	4.56	2.28	2.78	1.30	3.20	T	-----	25.56
1882	0.60	0.48	0.86	2.04	2.54	3.11	2.98	0.92	0.50	3.44	0.50	0.11	18.08
1883	0.71	1.45	1.21	1.94	4.33	2.17	3.32	2.88	0.76	2.81	0.00	0.40	21.98
1884	0.16	0.84	1.56	2.07	m0.46	-----	-----	-----	-----	-----	-----	-----	-----
Means	0.56	1.09	0.97	1.43	3.00	3.69	2.39	2.52	0.70	2.32	0.25	0.49	19.41

HENRY, S. DAK.

1886	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.06	0.49	0.25	-----
1887	0.23	0.39	0.29	3.78	0.90	3.72	3.90	2.81	1.35	-----	-----	-----	-----

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

HIGHMORE, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1887		*6.30	3.50						*4.60				
1888							5.79	3.10					
1890			0.30	0.19	0.83	6.17	0.36	0.56	0.45	0.32	0.30		
1891	0.00	T	0.83	1.94			0.72	0.80					
Means		3.15	1.04	1.06			2.29	1.49	2.52				

HOWARD, S. DAK.

1890									0.34	0.64	0.45	0.75	
1891	T	1.12	2.03		1.87	6.37	0.76	1.81	0.50	1.10	0.64	1.55	
Means									0.42	0.87	0.54	1.15	

HURON, S. DAK.

1881							3.58	6.31	3.11	2.10	0.45	0.06	
1882	0.14	0.25	0.80	4.18	4.50	5.86	5.88	1.44	0.86	3.37	0.61	0.23	28.12
1883	0.17	0.47	0.42	2.14	4.45	4.33	5.20	1.77	1.68	1.96	0.05	0.61	23.25
1884	0.09	0.58	1.53	2.70	2.90	3.18	5.11	1.18	1.26	1.52	0.17	0.62	20.84
1885	0.15	0.22	0.12	1.06	5.20	5.43	4.52	3.89	2.61	0.98	1.50	0.10	25.78
1886	0.48	0.16	0.62	3.52	1.58	1.90	1.60	5.62	1.59	1.26	1.18	0.74	20.25
1887	0.33	1.11	0.64	3.72	1.39	3.98	4.96	6.13	0.15	0.79	0.25	2.09	25.54
1888	0.78	0.52	1.22	0.88	4.98	1.10	3.11	3.46	0.19	0.29	0.34	0.18	17.05
1889	1.26	0.93	0.19	3.41	3.04	1.04	3.51	0.66	3.89	0.55	0.16	1.53	20.17
1890	0.66	0.18	0.32	0.64	2.88	5.87	1.41	0.73	0.32	0.61	0.38	0.68	14.68
1891	0.07	1.32	1.64	3.45	0.44	8.08	1.01	1.43	0.47	0.78	0.94	0.54	20.17
Means	0.41	0.57	0.75	2.57	3.14	4.08	3.63	2.97	1.47	1.29	0.55	0.67	22.10

KIMBALL, S. DAK.

1886				3.20	0.70	2.55	1.05	2.95	1.35	0.60	0.60	1.10	
1887	0.70	1.35	0.40	2.75	0.60	2.05	3.40	10.15	0.15	0.30	0.20	2.60	24.65
1888	0.40	0.20	1.05	1.00	4.00	1.77	0.90	2.15	0.15	0.60	0.10	0.20	12.52
1889	1.10	1.00	0.12	2.40	1.56	0.72	3.93	1.76	3.43	0.50	0.47	0.75	17.74
1890	0.60	0.18	0.87	1.45	2.03	3.07	1.98	2.21	0.17	0.44	0.68	0.40	14.08
1891	0.40	1.70	1.00	3.25	0.56	9.28	2.53	2.91	0.18	0.67	1.00	0.76	24.24
Means	0.64	0.89	0.69	2.34	1.58	3.24	2.30	2.19	0.90	0.52	0.54	0.97	16.77

LEAD CITY, S. DAK.

1878							5.77	2.61	2.06	1.81			
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LOWER BRULE AGENCY, S. DAK.

1875									1.50	0.33	0.09	0.28	
1876	0.22	0.27	0.57	0.13	0.28	3.02	1.46	4.38	3.04	0.26	0.27	0.14	14.04
1877	0.32		1.74	2.00	3.16	1.17	2.04		3.34	1.09	0.20	2.23	
1878	0.05	0.10	0.15	3.44	1.98	1.22	6.30	1.44	0.16	0.10	0.78	*0.20	*15.92
Means	0.20	0.18	0.82	1.86	1.81	1.80	3.27	2.91	2.01	0.44	0.34	0.71	16.35

MAMMOTH SPRINGS, S. DAK.

1883									0.00	0.75	0.51	3.42	
1884	1.48	0.94	1.32										

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

FORT MEADE, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1879	0.38	1.00	0.92	0.75	-----	4.68	0.78	1.40	0.14	1.60	0.04	0.89	-----
1880	*0.56	1.30	0.95	1.10	3.33	2.66	1.62	3.91	T	0.54	0.44	0.39	-----
1881	0.10	0.10	0.60	4.77	3.87	5.47	1.50	1.57	1.00	0.63	0.46	T	*15.06
1882	0.10	0.10	0.60	4.77	3.87	5.47	3.05	0.44	0.26	0.49	0.05	0.12	19.32
1883	2.90	0.30	2.16	4.50	9.61	1.56	2.80	0.18	1.60	0.67	0.05	0.72	27.05
1884	0.37	0.33	2.26	5.04	8.58	0.48	1.20	2.30	0.23	*0.75	0.53	0.90	*22.97
1885	0.32	0.23	0.52	1.30	0.64	3.38	1.52	3.22	0.28	0.74	0.93	0.17	13.25
1886	0.32	0.67	0.88	2.17	0.57	0.90	3.38	1.50	0.40	0.40	1.60	0.72	13.51
1887	0.56	0.20	0.76	2.12	2.72	1.76	4.46	4.25	1.10	0.40	0.24	0.36	18.93
1888	1.65	1.29	0.75	0.20	3.94	5.50	2.64	3.54	0.02	0.14	0.16	0.17	20.00
1889	0.27	0.85	0.12	2.64	2.02	1.60	6.38	0.00	0.67	1.71	0.88	0.86	18.00
1890	0.55	0.46	1.24	1.65	2.31	6.30	0.16	1.64	0.76	0.38	0.40	0.38	16.23
1891	0.78	0.83	1.63	2.29	6.60	4.29	1.75	1.50	0.87	0.41	0.52	0.32	21.79
Means	0.73	0.63	1.07	2.38	4.02	3.22	2.40	1.96	0.56	0.68	0.48	0.46	18.59

MILLBANK, S. DAK.

1889	-----	-----	-----	0.27	1.54	10.53	0.86	1.53	1.45	1.35	0.30	1.40	-----
1890	0.00	-----	-----	*1.86	1.90	3.04	1.44	0.55	0.78	0.67	0.40	0.45	-----
1891	0.00	0.25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Means	0.00	-----	-----	1.06	1.72	6.78	1.15	1.04	1.12	1.01	0.35	0.80	-----

MITCHELL, S. DAK.

1891	-----	-----	-----	-----	-----	8.50	3.01	1.86	1.95	1.09	0.31	1.95	-----
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MORRISTON, S. DAK.

1877	0.60	0.10	3.35	2.60	4.60	2.40	1.60	1.10	2.70	3.50	0.25	3.05	25.85
1878	0.45	0.33	1.30	4.90	2.30	3.40	10.20	1.00	1.20	0.20	1.55	1.00	27.83
1879	0.10	0.30	0.40	1.20	5.65	4.75	5.00	1.70	1.90	0.70	0.20	0.90	22.80
1880	0.25	1.00	0.60	1.30	3.60	6.90	1.80	5.80	-----	2.30	0.05	0.65	-----
1881	1.30	1.60	1.50	1.00	7.40	6.80	2.40	8.60	3.80	3.80	0.40	0.15	38.75
1882	0.60	0.70	1.20	4.30	2.10	4.50	4.30	3.00	0.50	3.30	0.60	0.40	25.50
1883	0.60	0.70	1.10	2.55	4.80	3.90	6.30	2.80	1.90	-----	-----	-----	-----
1884	-----	-----	1.50	3.40	4.20	3.10	2.60	-----	-----	-----	-----	-----	-----
Means	0.56	0.68	1.37	2.66	4.31	4.47	4.28	3.43	2.13	2.30	0.51	1.02	27.72

MOUTH CHERRY, S. DAK.

1861	-----	-----	-----	9.30	6.32	-----	-----	-----	-----	-----	-----	-----	-----
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OELRICHS, S. DAK.

1890	-----	-----	1.12	1.47	2.59	-----	1.07	0.10	0.13	0.09	0.45	0.10	-----
1891	1.35	2.80	*4.20	0.40	1.75	2.00	2.90	1.66	2.32	0.90	0.58	1.19	22.05
Means	-----	-----	2.66	0.94	2.17	-----	1.98	0.88	1.22	0.50	0.52	0.64	-----

OLIVET, S. DAK.

1877	-----	-----	-----	-----	-----	3.14	3.23	2.31	1.44	4.82	0.80	2.86	-----
1878	0.08	0.43	0.36	4.96	2.48	3.37	5.96	1.11	2.56	0.08	0.50	1.60	23.49
1879	0.10	0.51	0.42	1.20	2.66	5.35	1.83	2.02	1.57	1.09	0.07	0.72	17.54

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

OLIVET, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1880	0.39	0.46	0.80	0.31	5.90	6.03	2.30	5.62	0.59	2.02	0.03	0.95	25.40
1881	1.40	3.00	2.69	2.45	10.08	2.82	1.30	3.95	6.34	2.75	0.38	0.15	37.31
1882	0.34	0.75	0.34	3.64	3.17	6.69	2.97	3.14	0.37	3.03	0.25	-----	-----
Means	0.46	1.03	0.92	2.51	4.86	4.57	2.93	3.02	2.14	2.30	0.34	1.26	26.34

ONIDA, S. DAK.

1889	-----	-----	-----	2.27	2.27	1.52	2.14	-----	0.37	-----	-----	-----	-----
1890	-----	-----	-----	0.10	0.22	-----	0.24	0.27	1.25	0.25	0.55	-----	-----
1891	-----	-----	-----	1.70	1.56	1.08	0.77	0.33	1.26	1.06	0.42	0.51	-----
Means	-----	-----	-----	1.36	1.35	1.30	1.05	0.30	0.96	0.66	0.48	-----	-----

PARKER, S. DAK.

1891	-----	-----	-----	-----	-----	-----	1.30	0.73	0.38	-----	0.45	-----	-----
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PARKSTON, S. DAK.

1887	-----	1.75	0.65	3.17	1.37	2.94	5.20	10.84	0.75	0.15	0.40	2.50	-----
1888	0.60	0.08	1.55	1.84	8.98	1.16	2.15	4.47	-----	-----	0.10	0.20	-----
1889	1.02	0.75	0.11	-----	-----	2.64	3.86	2.67	6.54	0.70	*0.76	1.25	-----
1890	1.00	0.20	1.47	1.73	2.10	3.20	2.30	-----	-----	-----	-----	0.15	-----
1891	0.12	2.50	1.60	3.18	1.05	3.43	4.00	4.00	0.25	0.65	1.20	1.50	23.48
Means	0.68	1.06	1.08	2.48	3.38	2.67	3.50	5.50	2.51	0.50	0.62	1.12	25.10

PIERRE, S. DAK.

1891	0.20	0.26	0.30	1.11	0.83	0.96	0.30	0.45	0.45	0.66	0.23	0.45	6.20
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FORT PIERRE, S. DAK.

1855	-----	-----	-----	-----	-----	-----	0.38	3.03	1.88	0.42	1.74	0.39	-----
1856	0.02	0.19	0.64	2.68	2.19	0.48	1.98	0.33	0.70	1.75	1.05	0.55	12.56
1857	0.97	2.17	0.29	0.58	-----	-----	-----	-----	-----	-----	-----	-----	-----
Means	0.50	1.18	0.46	1.63	-----	-----	1.18	1.68	1.29	1.08	1.40	0.47	-----

PLANKINTON, S. DAK.

1891	-----	-----	-----	-----	1.14	6.67	2.10	2.41	-----	-----	-----	-----	-----
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FORT RANDALL, S. DAK.

1857	0.91	0.72	0.11	1.21	1.96	1.98	1.94	1.14	3.10	2.04	0.85	0.20	16.16
1858	1.70	0.45	0.38	2.17	3.22	1.36	3.85	3.96	0.92	2.76	0.26	0.27	21.30
1859	0.04	0.70	1.76	0.22	3.75	3.15	0.26	3.84	1.38	0.18	0.28	0.14	15.70
1860	0.00	0.32	0.20	1.28	4.36	3.40	2.32	1.58	4.05	1.20	0.40	0.08	19.19
1861	0.37	0.10	1.34	1.54	2.76	2.18	1.47	4.66	4.27	0.64	0.36	0.54	20.23
1862	0.56	0.27	0.74	1.43	2.35	1.29	4.47	4.40	3.46	0.04	0.20	0.30	15.51
1863	0.14	0.20	0.20	0.90	0.22	1.44	1.01	0.15	1.56	0.50	0.24	0.68	7.24

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

FORT RANDALL, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1864	0.20	T	0.54	0.30	-----	0.70	0.30	1.50	1.64	1.60	T	0.00	-----
1865	0.00	0.40	0.72	0.38	1.31	-----	-----	-----	0.00	-----	-----	-----	-----
1866	-----	-----	-----	-----	-----	-----	-----	-----	3.94	0.26	1.50	0.14	-----
1867	0.59	0.63	0.76	0.16	4.08	3.60	2.92	0.74	0.00	[1.31]	[0.49]	0.57	[15.85]
1868	0.74	0.68	1.22	0.84	4.50	2.26	0.64	1.33	0.44	1.33	0.33	0.32	14.63
1869	[0.41]	0.20	1.21	0.96	1.81	1.24	5.18	[2.60]	2.38	0.07	0.52	0.34	[16.92]
1870	0.35	T	0.81	0.87	2.23	0.49	0.29	0.03	1.69	0.11	0.03	0.22	7.12
1871	0.05	0.76	0.18	2.11	[3.54]	0.48	1.53	4.44	0.48	0.41	1.28	0.21	[15.47]
1872	[0.41]	0.22	0.85	1.06	8.67	1.65	2.13	2.00	0.13	1.13	0.11	0.06	[18.42]
1873	0.47	1.66	0.15	2.73	4.71	3.13	1.20	0.26	0.60	3.10	0.05	0.24	18.30
1874	0.11	0.21	0.88	0.58	1.76	5.70	2.71	1.49	1.16	*1.78	0.76	0.76	*17.90
1875	0.72	0.42	0.77	1.60	2.69	12.82	0.75	5.15	3.70	T	T	0.10	28.72
1876	0.47	0.75	2.49	2.07	2.70	1.86	8.55	4.90	8.45	0.45	0.70	0.50	33.89
1877	T	0.20	1.90	4.35	8.15	6.60	4.10	2.20	2.10	5.95	0.90	4.75	41.20
1878	0.30	0.50	1.48	6.30	4.98	7.80	11.85	0.70	2.70	0.58	1.10	*1.01	*39.30
1879	T	*0.52	0.69	2.42	6.40	3.25	2.45	1.95	0.35	0.75	T	2.05	*20.83
1880	1.06	1.87	1.61	1.07	6.21	4.80	3.10	3.80	0.20	3.20	T	0.50	27.42
1881	0.10	1.30	2.55	2.05	6.05	3.15	1.35	1.85	3.95	1.90	0.60	0.10	24.95
1882	0.20	2.00	1.50	3.40	2.70	4.40	1.60	3.50	0.50	3.90	T	2.20	25.90
1883	0.80	1.70	2.30	1.70	4.70	5.00	4.80	1.90	1.50	2.20	T	3.51	30.11
1884	0.58	0.47	2.98	2.80	1.70	4.31	2.32	2.39	0.04	0.97	0.07	1.08	19.71
1885	0.20	0.42	0.13	1.78	1.75	6.16	3.83	5.17	2.36	1.16	1.48	0.12	24.56
1886	0.41	0.32	1.50	3.39	2.62	2.02	0.24	4.25	4.05	0.91	1.04	0.75	21.50
1887	0.24	0.58	0.20	1.14	0.31	0.88	2.90	3.49	1.68	0.36	0.74	4.21	16.73
1888	0.20	0.47	0.92	1.30	5.66	2.64	[2.30]	3.71	0.66	0.66	[0.19]	0.66	[19.37]
1889	0.75	0.40	0.25	1.95	1.97	1.43	5.49	1.54	3.09	0.60	1.10	0.45	19.02
1890	0.60	0.12	1.19	2.35	2.06	2.37	1.95	1.94	0.13	0.64	0.64	0.05	14.04
1891	0.42	1.34	1.40	4.39	0.62	6.34	3.23	2.84	0.36	0.79	0.42	0.80	22.95
Means	0.42	0.61	1.06	1.85	3.41	3.33	2.70	2.59	1.91	1.28	0.49	0.82	20.47

RAPID CITY, S. DAK.

1881	-----	0.77	0.78	0.95	2.02	3.67	2.64	0.20	1.45	0.71	0.12	0.00	-----
1882	0.20	0.19	0.07	3.47	4.71	5.07	1.80	0.66	0.50	0.60	0.60	0.40	18.27
1883	0.18	0.20	0.35	0.90	11.02	-----	-----	-----	-----	-----	0.51	1.66	-----
1884	1.20	0.94	2.40	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1888	0.33	1.62	1.76	0.41	6.01	4.74	1.69	4.76	0.02	0.43	0.47	0.51	22.75
1889	0.52	1.39	0.56	4.22	2.19	2.97	4.52	0.11	0.37	0.43	0.32	0.33	17.93
1890	0.47	0.66	1.40	1.55	2.46	3.77	0.13	1.83	0.75	0.56	0.27	0.17	14.02
1891	0.27	0.87	1.96	2.74	1.72	3.25	2.09	1.97	1.32	0.34	0.17	0.05	16.75
Means	0.45	0.83	1.16	2.03	4.30	3.91	2.14	1.59	0.74	0.51	0.35	0.45	18.46

REDFIELD, S. DAK.

1889	-----	-----	-----	2.09	1.62	1.50	-----	-----	-----	-----	-----	-----	-----
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ROSCOE, S. DAK.

1889	-----	-----	-----	-----	0.45	0.80	3.15	0.51	1.76	-----	-----	-----	-----
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SANBORN, S. DAK.

1889	-----	-----	-----	-----	2.40	-----	-----	-----	-----	-----	-----	-----	-----
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ST. LAWRENCE, S. DAK.

1890	-----	-----	-----	-----	-----	-----	-----	0.74	0.26	0.46	0.41	0.35	-----
1891	0.27	1.45	0.42	2.78	1.11	6.94	0.52	2.53	-----	-----	0.28	0.45	-----
Means	-----	-----	-----	-----	-----	-----	-----	1.64	-----	-----	0.34	0.40	-----

Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

SCRANTON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1889												0.80	
1890	0.35	0.60	0.43	0.54	0.66	9.74	1.72	0.23	1.15	0.72	0.58	0.87	17.59
1891	0.10	1.07	1.04	2.16									
Means	0.22	0.84	0.74	1.55								0.84	

SIOUX FALLS, S. DAK.

1890						3.70	1.35	3.03	3.78	0.37	0.35	0.75	
1891	0.35	1.01	1.32	2.69			0.68	2.99	T	1.35	0.60	2.96	
Means							2.03	3.01	3.78	0.86	0.48	1.86	

FORT SISSETON, S. DAK.

1866									0.23				
1867					7.96	13.80	8.88	2.37	1.65				
1869	0.20	*1.47	0.49	1.82	1.54	0.99	0.67	3.31	2.76	0.41	0.36	0.07	*14.09
1870	0.48	0.25	0.67	0.23	5.51	4.73	2.63	0.89	0.45	1.50	0.20	0.32	17.86
1871	0.44	0.30	1.08	2.36	0.74	1.96	1.48	0.76	0.36	0.60	0.52	0.20	10.80
1872	0.20	0.22	0.64	1.78	4.38	4.02	5.04	2.56	1.34	2.46	0.56	0.16	23.36
1873	2.14	1.16	1.22	2.54	4.52	2.82	3.82	2.00	1.10	3.26	1.16	1.38	27.12
1874	1.18	2.40	3.90	1.84	2.70	4.56	1.16	3.34	0.62	3.90	2.60	4.24	32.44
1875	2.84	6.30	4.50	2.78	3.06	2.22	2.70	4.16	2.04	0.36	0.30	0.14	31.40
1876	0.88	0.54	0.80	1.92	1.46	1.52	2.00	4.86	2.22	1.84		0.82	
1877	0.66	0.00	1.22	1.74				0.80					
1878	0.14		2.04	5.00	2.00	3.50	4.70			0.50		0.74	
1879	0.08	0.80	0.34	1.50	4.50		6.76		1.20	0.80	0.00	0.80	
1880	0.30	0.22	2.00		3.50	6.00	5.08	3.88	0.60	2.26	0.12	0.20	
1881	0.56		2.00	1.30	2.52	2.86	1.02	3.96	1.64	1.62	0.26	0.12	
1882	0.36	0.32	*1.04	2.46	2.20	7.42	3.64	1.02	0.36	3.50	0.70	0.19	*23.21
1883	0.13	0.22	0.05	1.12	2.51	1.08	2.22	1.92	1.65	2.07		0.35	
1884	0.35	0.82	0.82	1.26	3.00	1.32	3.45	2.37	1.43	3.63	0.52	1.31	20.28
1885	0.48	0.15	0.40	1.86	1.79	3.74	2.79	1.53	4.10	0.70	1.70	0.75	19.99
1886	0.60	0.65	0.55	3.06	1.64	1.72	1.23	1.60	0.78	1.00	0.96	0.32	14.11
1887	0.40	0.46	0.42	2.80	1.87	5.82	5.50	8.07	1.02	0.94	0.19	1.37	28.86
1888	0.25	0.17	0.59	0.60	1.90	1.56	3.48	2.10	0.08	0.60		0.08	
1889	0.46	0.31		1.52									
Means	0.63	0.88	1.24	1.97	2.96	3.77	3.41	2.71	1.28	1.68	0.68	0.71	21.92

SPEARFISH, S. DAK.

1889	0.75	1.20	0.40	3.87	2.60	1.45	5.84	0.14	1.42	1.72	0.48	2.00	21.87
1890	2.10	0.75	1.54	1.47	3.42	6.81	0.20	1.66	0.53	1.37	0.35	0.53	20.73
1891	0.82	2.04	1.73	2.66	3.15	7.29	2.53	2.51	0.71	1.23	0.75	0.90	26.32
Means	1.22	1.33	1.22	2.67	3.06	5.18	2.86	1.44	0.89	1.44	0.53	1.14	22.68

SPRING LAKE, S. DAK.

1888										11.75	0.05	0.28	
1889	0.75	0.78	0.50	8.40	5.40	4.00	8.75	2.00					

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

FORT SULLY, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1866				1.40								0.15	
1868										T	0.62	0.40	16.15
1869	0.08	0.50	0.06	0.96	3.11	3.50	0.90	4.96	1.06	1.10	0.10	T	17.48
1870	0.70	0.55	2.40	2.10	2.76	1.64	2.50	1.35	2.28	0.20	0.30	0.11	23.74
1871	0.90	0.50	9.60	2.63	2.25	1.50	4.50	0.25	T	0.21	1.28	0.57	19.42
1872	T	0.10	0.25	3.66	2.98	2.34	6.48	1.53	0.02	0.56	0.15	0.08	14.62
1873	1.00	0.29	0.49	1.06	3.17	3.23	1.86	2.66	0.07	1.51	0.55	0.08	16.24
1874	0.09	0.17	0.92	0.21	5.05	6.24	0.67	0.57	0.18	0.38	0.20	0.15	13.99
1875	0.53	0.91	0.58	1.60	2.62	2.36	0.51	3.26	0.89	0.45	0.52	0.56	19.54
1876	0.09	0.10	0.91	1.07	1.37	4.25	1.99	4.14	4.09	0.88	2.48		22.91
1877	1.01	0.03	2.51	4.14	4.02	1.76	3.69	0.84	0.44	0.50	0.39	0.56	20.19
1878	0.02	0.25	0.14	3.91	3.47	1.73	7.45	0.80	0.97	0.03	0.56		23.50
1879	0.15	0.23	0.24	1.20	4.70	6.14	6.35	2.41	0.55	0.14	0.16	0.56	16.66
1880	0.88	0.65	1.02	1.71	1.88	2.35	1.93	5.26	0.12	0.50	*0.31	*0.00	*14.85
1881	0.33	0.36	0.54	1.00	2.96	3.02	1.83	0.50	2.50	0.14	*0.31	*0.06	*12.20
1882	0.23	0.09	0.42	2.56	1.81	3.19	2.12	0.20	1.07	0.08	1.37	0.00	1.18
1883	0.17	0.44	0.67	2.68	3.58	3.38	3.28	3.08	0.08	0.71	1.29	0.19	0.89
1884	0.88	0.35	0.87	0.14	0.36	3.00	2.57	0.72	0.12	0.71	1.29	0.19	0.89
1885	0.37	0.30	0.06	2.28	2.70	5.12	2.71	4.50	1.77	0.12	0.65	0.14	20.72
1886	0.18	0.10	0.66	3.62	0.86	3.24	2.44	1.41	0.44	0.49	1.60	0.96	16.00
1887	1.03	0.18	T	0.90	1.28	2.88	3.04	3.12	0.35	0.85	0.13	0.50	14.26
1888	0.37	0.35	0.49	0.53	2.63	3.73	3.47	2.50	0.12	0.21	0.11	0.26	14.77
1889	0.70	0.46	0.59	2.86	2.96	1.64	3.35	1.01	1.09	0.08	0.19	0.36	15.29
1890	0.15	0.20	0.28	0.58	1.27	6.41	0.25	0.61	1.54	0.44	1.01	0.44	13.28
1891	0.28	0.78	0.65	2.64	1.98	2.13	0.78	1.41	1.37	0.53	0.33	0.30	13.18
Means	0.44	0.43	1.06	1.89	2.60	3.25	2.81	2.05	0.95	0.57	0.44	0.47	16.96

SWAN LAKE, S. DAK.

1881	0.85	1.07	0.79	0.53	4.34	0.46	1.60	3.90	5.00				
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TYNDALL, S. DAK.

1891							1.31	5.89	0.26	0.94	0.57	1.95	
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VERMILLION, S. DAK.

1883													
1884	0.00	0.50	1.50	1.22	1.68	1.57		3.38	*1.70	2.18	T	*0.31	
1885	0.53	0.22	T	1.89	1.17	3.20	2.35	3.87	3.07	0.98	1.54	0.70	
1886	1.35	0.59	2.40	3.60	2.23	2.55	0.75	2.97	1.65	0.40	2.50	0.35	19.17
1889												1.00	21.99
1890	0.67	0.55	0.82	1.13	2.37	2.19	2.89	2.14	0.35	1.35	0.58	*0.95	
1891	0.50	1.30										0.10	15.14
Means	0.61	0.63	1.18	1.96	1.86	2.38	2.00	3.09	1.69	1.23	1.16	0.57	18.36

WATERTOWN, S. DAK.

1891											0.52	1.07	
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WEBSTER, S. DAK.

1882													
1883	3.33	2.18	1.80	1.71	3.99	8.45	8.21	0.62	0.65	9.39	2.82	1.36	
1884	1.42	7.46	5.30	3.73	9.19	1.94	2.32	1.84	3.78	4.85	0.08	4.72	32.54
1885	0.31	T	0.71	6.33	5.33	8.01	14.65	6.41	1.48	5.09	0.92	1.52	65.18
1886	1.24	1.93	2.02	7.72	6.22	8.88	4.97	1.41	8.28	0.79	1.17	0.63	38.81
						8.91	1.37	2.36	1.71	1.77	4.33	2.32	41.90

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

63

Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

WEBSTER, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1887	4.55	5.06	1.64	3.94	1.72	3.09	4.73	2.27	0.88	1.44	0.29	2.59	32.20
1888	2.29	1.00	1.93	2.42	2.09	1.99	2.88	4.14	0.48	1.35	0.20	0.40	21.17
1889	3.34	3.94	1.94	2.03	4.01	7.07	7.07	0.42	4.84	0.63	0.20	2.53	38.02
1890	2.04	0.53	1.67	0.28	3.58	9.31	3.73	3.39	2.07	1.88	3.20	2.28	33.96
1891	0.86	2.55	2.05	3.86	.....	.....	3.43	1.10	4.11	1.69	2.39	3.30	.....
Means	2.15	2.74	2.12	3.56	4.52	6.41	5.34	2.40	2.83	2.89	1.56	2.16	38.68

WENTWORTH, S. DAK.

1883 .....	.....	.....	.....	.....	.....	.....	.....	.....	1.81	.....	.....	.....	.....
1885				3.71	2.89	3.06	1.34					0.38	2.08
1891													

WESSINGTON SPRINGS, S. DAK.

1891							2.70	2.14	0.23	0.55	0.57	1.95	
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WICKLOW, S. DAK.

1882						5.07	5.45	1.78	0.27	2.45	0.66	0.26	
1883	1.22	1.27		3.38									

WOLSEY, S. DAK.

1889	1.85	0.90	T	3.00	3.60	0.70	2.84	0.67	3.31	0.34	0.07	1.60	18.88
1890	0.50	0.08	0.29	0.40	1.81	4.98	1.16	0.88	0.43	0.51	0.58	0.65	12.27
1891	0.12	1.60	2.25	2.79	0.80	5.50	0.50	1.83	0.35	0.75	1.23	0.75	18.47
Means	0.82	0.86	0.85	2.06	2.07	3.73	1.50	1.13	1.36	0.53	0.63	1.00	16.54

WOONSOCKET, S. DAK.

1888 .....	.....	.....	.....	0.86	4.56	1.99	1.62	0.82	0.17	0.47	0.10	0.08	.....
1889	0.80	0.90	0.12	2.58	1.92	1.57	3.91	0.62	2.81	0.40	T	1.05	16.68
1890	0.80	0.15	0.71	0.87	2.42	4.47	1.04	0.81	0.34	0.52	0.47	0.70	13.30
Means	0.80	0.52	0.42	1.44	2.97	2.68	2.19	0.75	1.11	0.46	0.19	0.61	14.14

YANKTON, S. DAK.

1862 .....	.....	.....	.....	.....	.....	3.62	.....	.....	.....	.....	.....	.....	.....
1873 .....	.....	.....	.....	2.00	6.98	4.59	1.59	2.80	0.93	1.49	0.03	0.52	.....
1874	0.57	0.65	0.79	0.24	2.59	6.65	3.84	4.05	1.84	1.64	0.56	0.51	23.93
1875	1.07	1.51	1.79	5.26	2.04	9.21	5.53	4.95	5.33	0.14	0.12	0.20	37.15
1876	0.32	1.10	2.18	0.97	3.15	3.18	5.49	5.14	5.26	0.88	0.80	0.37	28.84
1877	0.74	0.33	1.37	5.99	4.45	5.07	1.31	1.16	1.23	3.66	0.54	2.46	28.31
1878	0.20	0.27	0.93	5.14	4.04	7.83	6.96	0.41	1.36	0.18	0.39	0.99	28.73
1879	0.23	0.36	1.05	0.37	2.35	5.34	7.54	1.68	2.81	0.33	0.23	0.41	22.73
1880	0.62	0.16	0.95	0.40	4.04	4.99	3.32	3.01	0.98	1.98	0.21	0.99	21.68
1881	1.23	2.70	1.74	2.19	9.88	3.51	4.54	1.77	8.61	3.47	0.90	0.11	40.95
1882	0.04	0.09	0.06	2.93	5.25	4.87	1.65	0.64	0.07	3.93	0.31	0.79	20.63

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual precipitation, in inches, at stations in South Dakota—Continued.

YANKTON, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1883	1.06	0.73	1.42	5.71	8.76	4.40	3.33	2.85	3.91	1.98	0.08	0.91	35.14
1884	0.25	1.80	0.92	5.73	1.43	1.72	4.63	2.61	0.28	1.97	0.02	0.80	22.16
1885	0.53	0.43	0.25	5.08	4.01	2.90	1.97	6.21	4.80	1.24	2.69	0.07	30.18
1886	0.43	0.57	3.38	5.12	3.39	3.07	0.69	5.40	3.45	0.31	2.44	0.90	29.15
1887	0.43	0.64	0.26	2.45	1.28	2.48	5.00	4.46	6.70	0.74	0.57	2.07	27.08
1888	0.37	0.41	1.24	2.16	8.56	1.03	1.91	3.29	0.50	0.55	0.19	0.68	20.89
1889	0.96	0.20	0.27	1.46	1.72	2.68	4.54	2.68	2.31	0.48	1.04	1.37	19.71
1890	0.56	0.46	1.07	1.84	4.18	3.59	4.27	2.16	1.16	0.92	0.79	0.25	21.25
1891	0.78	1.47	1.75	3.79	1.45	4.97	3.27	3.30	0.36	0.62	0.34	2.33	24.43
Means	0.58	0.77	1.19	3.11	4.19	4.28	3.76	3.09	2.73	1.40	0.64	0.88	26.62

Monthly and annual precipitation, in inches, at two stations in Minnesota.

MOORHEAD, MINN.

1881	0.60	2.13	0.62	0.77	2.80	5.59	1.97	5.89	4.75	2.75	1.41	0.20	29.48
1882	1.34	0.80	2.83	1.69	5.32	5.43	4.92	2.50	1.23	4.04	2.54	1.37	34.01
1883	1.19	0.74	0.38	1.65	3.59	2.32	4.57	3.16	2.51	3.22	0.16	1.47	24.96
1884	0.55	1.32	1.03	1.23	1.75	1.84	7.32	6.17	2.49	3.70	0.34	0.76	28.50
1885	0.02	0.08	0.31	3.43	2.27	7.92	3.34	1.47	2.20	0.68	0.64	0.32	22.68
1886	0.94	0.78	0.14	5.49	2.51	3.71	5.40	1.32	1.31	2.21	2.42	0.53	26.76
1887	0.48	0.58	0.26	2.45	2.57	3.77	6.40	1.45	0.30	1.40	0.57	1.74	21.97
1888	1.09	0.42	1.04	1.43	2.20	2.98	3.48	0.92	0.55	2.22	0.08	0.09	16.50
1889	1.13	0.85	0.24	1.48	1.71	0.96	1.95	1.40	6.27	0.07	0.18	0.83	17.07
1890	0.26	0.40	0.56	0.19	1.42	6.60	3.59	3.69	2.62	2.10	0.31	0.05	21.79
1891	0.91	1.36	1.46	1.91	1.03	4.32	3.57	2.54	3.50	1.65	0.99	1.07	24.31
Means	0.77	0.86	0.81	1.97	2.47	4.13	4.23	2.77	2.52	2.19	0.88	0.77	24.37

ST. VINCENT, MINN.

1880									2.19	2.69	0.07	0.73	
1881	0.13	0.56	0.08	0.81	4.00	3.47	0.48	1.96	1.99	1.30	0.48	0.25	15.51
1882	0.74	0.83	1.66	0.90	2.94	3.35	3.79	0.42	1.51	4.60	1.02	0.72	22.48
1883	0.33	0.24	0.11	0.73	2.13	1.03	2.16	5.16	1.57	3.90	0.26	0.26	17.88
1884	0.14	0.24	0.38	0.80	1.11	2.63	3.47	7.18	3.44	1.15	0.42	0.85	21.81
1885	0.32	0.10	0.46	2.85	1.59	2.92	3.82	0.95	0.98	0.93	1.12	0.54	16.58
1886	0.49	0.46	0.29	2.09	1.53	2.15	2.27	0.41	3.20	1.36	0.52	0.27	15.04
1887	0.68	0.83	0.48	1.43	3.57	4.15	4.28	1.68	0.45	0.16	0.22	0.54	18.47
1888	0.71	0.22	0.93	1.06	0.28	7.37	2.76	0.52	1.22	1.32	0.30	0.53	17.22
1889	0.82	1.03	0.35	0.69	0.81	0.76	1.23	2.20	2.77	0.18	1.20	2.40	14.44
1890	1.98	0.63	0.95	1.41	1.29	4.08	2.32	2.40	3.82	2.79	0.19	0.23	22.09
1891	0.78	2.04	1.23	1.68	1.29	8.17	2.56	3.12	2.43	2.38	0.88	1.79	28.35
Means	0.65	0.65	0.63	1.31	1.87	3.64	2.65	2.36	2.13	1.90	0.56	0.76	19.11

Monthly and annual precipitation, in inches, at three stations in Nebraska.

HAY SPRINGS, NEBR.

1886	0.55	0.93	1.51	1.83	1.80	2.66	3.09	2.32	0.37	0.37	2.19	0.60	18.22
1887	0.81	0.41	1.22	2.30	5.87	3.60	1.48	3.14	0.78	1.45	0.23	1.61	22.90
1888	0.44	1.22	0.94	0.88	7.25	3.26	3.09	3.38	0.00	0.15	0.33	0.32	21.26
1889	0.46	0.94	0.82	2.27	3.66	3.41	1.86	3.55	0.64	0.60	0.28	0.67	19.16
1890	0.61	0.40	1.01	1.73	2.24	4.55	2.75	1.27	T	0.43	0.61	0.35	15.95
1891	1.49	1.38	2.76	2.07	2.33	2.70	4.90	1.12	1.90	0.75	1.21	0.68	23.26
Means	0.73	0.88	1.38	1.85	3.86	3.36	2.86	2.46	0.62	0.62	0.81	0.70	20.13

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

65

Monthly and annual precipitation, in inches, at three stations in Nebraska—Continued.

FORT ROBINSON, NEBR.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1883							0.18	2.05		1.22	0.50	1.97	
1884	0.40	0.50	1.80	1.49	2.85	1.53	2.25	1.00	0.50	0.34	0.15	1.15	13.96
1885	0.45	1.12	0.65	2.60	2.15	3.94	2.66	1.41	0.50	1.80	1.70	0.05	19.03
1886	0.67	0.57	1.74	0.47	1.24	1.91	0.74	0.90	0.30	0.31	1.12	1.11	11.08
1887	1.11	0.50	0.63	2.60	3.72	0.72	1.90	3.32	1.05	8.60	0.36	0.74	25.25
1888	0.06	0.79	1.83	1.23	6.39	1.38	2.45	2.88	T	T	0.46	0.07	17.54
1889	0.08	0.32	T	1.39	2.55	2.71	2.67	2.15	0.38	0.74	0.13	0.78	13.90
1890	0.29	0.66	1.54	1.82	2.51	0.60	2.30	1.84	0.00	0.06	0.13	0.01	11.76
1891	0.95	0.89	1.75	1.57	2.05	3.29	3.24	1.94	1.52	0.45	0.57	0.52	18.74
Means	0.50	0.67	1.24	1.65	2.93	2.01	2.04	1.94	0.53	1.50	0.57	0.71	16.29

VALENTINE, NEBR.

1885									2.23	0.93	0.31	0.15	
1886	0.19	0.35	0.53	1.39	3.26	2.25	2.04	1.86	1.18	0.27	0.56	0.10	13.98
1887	0.29	0.41	0.23	2.52	2.60	3.89	2.53	2.94	1.36	0.57	0.13	0.53	18.00
1888	0.04	0.75	1.44	1.05	9.35	2.30	4.83	1.77	0.66	[0.70]	0.19	0.26	[23.34]
1889	1.27	0.15	1.19	3.87	2.05	2.99	2.60	0.34	1.71	2.12	0.56	0.84	19.69
1890	0.69	1.49	2.28	1.33	1.91	3.09	4.39	2.04	0.68	0.64	0.93	0.32	19.79
1891	0.61	1.55	2.58	3.12	1.33	6.36	4.29	4.68	0.40	1.65	0.78	0.42	27.77
Means	0.52	0.78	1.38	2.21	3.42	3.48	3.45	2.27	1.17	0.98	0.49	0.37	20.52

Monthly and annual precipitation, in inches, at one station in Iowa.

SIOUX CITY, IOWA.

1857									2.12		1.47		
1858		0.56	0.89	4.36	3.30	4.72	7.42	6.07	3.60	2.21	0.89	0.32	
1861	1.52		1.47	2.06	4.29	3.00	3.19	1.40	4.87	1.05	2.28	0.15	
1862	0.15	0.42		2.48	1.89	1.54	1.22	3.05	3.59	1.08		0.63	
1863	1.00	0.30	0.58									1.72	
1864	0.93		1.15	2.64	0.60								
1875										0.16			
1876		0.46	2.01	0.85	2.42	3.12	8.61	7.65	4.77	1.16	0.97	0.72	
1877	0.78	0.60	1.53	4.75	3.88	6.79	1.23	1.52	1.57	2.04	2.05	1.66	28.40
1878	0.41	0.20	2.21	3.46			5.78	1.05	2.88				
1879				3.70	8.70	6.15	8.25	3.50					
1881									11.15	5.80	1.60	1.10	
1887												1.24	
1887													
1888	1.40	0.33	1.56	4.96	5.53	1.21	4.65	6.38	0.56				
1889				1.72	1.40	4.45	3.31	1.19	1.71	0.21	1.99	1.14	
1890	1.14	0.40	2.12	1.32	2.29	3.61	2.59	3.64	2.36	1.84	0.84	0.10	22.25
1891	1.66	1.26	2.01	2.22	2.41	7.62	5.77	3.54	0.91	3.04	0.37	2.48	33.29
Means	0.90	0.50	1.55	2.88	3.34	4.22	4.73	3.54	3.34	1.86	1.38	1.02	29.26

APPENDIX No. 5.

Normal monthly and annual precipitation, in inches, from the stations of longest record.

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
NORTH DAKOTA.													
Abercrombie, Fort	0.49	0.55	1.01	1.55	2.22	3.17	2.22	2.43	1.82	0.98	0.69	0.70	17.83
Abraham Lincoln, Fort	0.41	0.55	0.74	2.05	2.14	3.44	2.08	1.84	0.77	0.84	0.48	0.69	16.03
Bismarek	0.57	0.65	0.97	2.25	2.63	3.59	2.54	2.19	1.09	1.11	0.62	0.69	18.90
Buford, Fort	0.48	0.54	0.51	0.98	2.24	2.78	1.62	1.30	0.91	0.91	0.48	0.54	13.29
Davenport	0.50	0.48	0.22	0.80	1.46	3.46	3.52	2.11	2.78	1.09	0.12	0.38	16.92
New England City	0.35	0.48	0.35	1.20	2.26	3.94	1.81	0.70	0.34	0.58	0.10	0.38	12.49
Pembina, Fort	0.53	0.90	0.98	1.58	2.52	4.06	2.64	2.10	1.62	1.59	0.77	1.01	20.30
Ransom, Fort	0.92	0.57	1.28	1.65	2.45	2.80	2.68	2.55	2.16	0.47	0.75	0.80	19.08
Rice, Fort	0.61	0.66	0.62	2.07	2.82	2.95	1.38	1.48	0.83	0.85	0.50	0.40	15.17
Richardton	2.25	1.19	1.09	3.47	2.34	4.62	3.62	3.38	1.30	0.89	0.85	1.48	26.48
Seward, Fort	0.17	0.17	0.68	0.79	3.18	3.82	1.88	2.45	1.12	0.53	0.16	0.14	15.09
Stevenson, Fort	0.44	0.37	1.08	1.16	2.00	3.19	1.83	2.38	1.38	0.96	0.49	0.49	15.77
Totten, Fort	0.49	0.53	0.92	1.40	2.32	3.69	2.37	2.49	0.99	1.20	0.83	0.55	17.78
Yates, Fort	0.52	1.02	0.62	1.52	1.61	3.68	3.19	1.63	0.80	0.58	0.38	0.66	16.21
Means	0.62	0.62	0.79	1.60	2.30	3.51	2.38	2.07	1.28	0.90	0.52	0.64	17.23
SOUTH DAKOTA.													
Alexandria	0.28	1.25	1.34	3.38	2.69	4.13	3.62	2.90	2.24	1.94	0.44	0.87	25.08
Bennett, Fort	0.53	0.66	0.78	2.08	2.38	3.45	2.48	1.84	1.33	0.69	0.46	0.57	17.25
Brookings	0.60	1.10	0.44	1.35	1.89	4.49	2.02	1.84	1.05	0.50	0.28	1.02	16.58
Deadwood	1.25	1.21	1.99	5.17	4.65	3.73	2.84	2.23	1.06	1.58	1.26	1.51	28.48
Hale, Fort	0.56	1.09	0.97	1.43	3.00	3.69	2.39	2.52	0.70	2.32	0.25	0.49	19.41
Huron	0.41	0.57	0.75	2.57	3.14	4.08	3.63	2.97	1.47	1.29	0.55	0.67	22.10
Kimball	0.64	0.89	0.69	2.34	1.58	3.24	2.30	2.19	0.90	0.52	0.51	0.97	16.77
Meade, Fort	0.73	0.63	1.07	2.38	4.02	3.22	2.40	1.96	0.56	0.68	0.48	0.46	18.59
Morrison	0.56	0.68	1.37	2.66	4.31	4.47	4.28	3.43	2.13	2.30	0.51	1.02	27.72
Olivet	0.46	1.03	0.92	2.51	4.86	4.57	2.93	3.02	2.14	2.30	0.34	1.26	26.34
Parkston	0.68	1.06	1.08	2.48	3.38	2.67	3.50	5.50	2.51	0.50	0.62	1.12	25.10
Randall, Fort	0.42	0.61	1.06	1.85	3.41	3.33	2.70	2.59	1.91	1.28	0.49	0.82	20.47
Rapid City	0.45	0.83	1.16	2.03	4.30	3.91	2.14	1.59	0.74	0.51	0.35	0.45	18.46
Sisseton, Fort	0.63	0.88	1.24	1.97	2.96	3.77	3.41	2.71	1.28	1.68	0.68	0.71	21.92
Sully, Fort	0.44	0.43	1.06	1.89	2.60	3.25	2.81	2.05	0.95	0.57	0.44	0.47	16.96
Vermillion	0.61	0.63	1.18	1.96	1.86	2.38	2.00	3.09	1.69	1.23	1.16	0.57	18.36
Webster	2.15	2.74	2.12	3.56	4.52	6.41	5.34	2.40	2.83	2.89	1.56	2.16	38.68
Wolsey	0.82	0.86	0.85	2.06	2.07	3.73	1.50	1.13	1.36	0.53	0.63	1.00	16.54
Woonsocket	0.80	0.52	0.42	1.44	2.97	2.68	2.19	0.75	1.11	0.46	0.19	0.61	14.14
Yankton	0.58	0.77	1.19	3.11	4.19	4.32	3.76	3.09	2.74	1.39	0.64	0.88	26.62
Means	0.68	0.92	1.08	2.41	3.24	3.78	2.91	2.49	1.54	1.26	0.59	0.88	21.78
MINNESOTA.													
Moorhead	0.77	0.86	0.81	1.97	2.47	4.13	4.23	2.77	2.52	2.18	0.88	0.77	24.36
St. Vincent	0.65	0.65	0.63	1.31	1.87	3.64	2.65	2.36	2.13	1.90	0.56	0.76	19.11
IOWA.													
Sioux City	0.90	0.50	1.55	2.88	3.34	4.22	4.73	3.54	3.34	1.86	1.38	1.02	29.26
NEBRASKA.													
Hay Springs	0.73	0.88	1.38	1.85	3.86	3.36	2.86	2.46	0.62	0.62	0.81	0.70	20.13
Robinson, Fort	0.50	0.67	1.24	1.65	2.93	2.01	2.04	1.94	0.53	1.50	0.57	0.71	16.29
Valentine	0.52	0.78	1.38	2.21	3.42	3.48	3.45	2.27	1.17	0.98	0.49	0.37	20.52

APPENDIX No. 6.

Monthly and annual average precipitation, in inches, from selected stations.

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.	Years of record.
Assinaboine, Ft., Mont.	0.98	0.63	0.60	0.83	1.41	3.00	2.22	1.62	1.20	0.53	0.66	0.63	14.68	10
Austin, Tex.	1.98	2.21	2.83	3.29	4.18	3.81	3.28	2.07	4.33	3.75	3.61	2.60	37.94	17
Benton, Fort, Mont.	0.72	0.42	0.54	1.13	2.59	2.37	1.65	1.03	0.93	0.72	0.58	0.57	13.25	17
Boise, Idaho	2.65	1.81	1.96	1.73	1.44	0.74	0.21	0.19	0.38	0.98	1.30	2.22	15.61	16
Concho, Fort, Tex.	0.72	0.90	1.00	1.42	3.35	2.40	2.60	2.84	3.02	1.71	1.03	1.28	22.27	15
Cheyenne, Wyo.	0.31	0.29	0.63	1.38	2.00	1.46	1.64	1.46	0.98	0.67	0.35	0.22	11.39	18
Custer, Fort, Mont.	0.86	0.46	0.57	1.15	2.10	2.62	1.01	1.16	0.81	0.94	0.39	0.74	12.72	11
Davenport, Iowa	1.98	1.97	2.28	2.78	3.78	4.37	3.45	4.06	3.45	3.11	1.88	1.65	34.76	18
Denver, Colo.	0.69	0.54	0.96	2.08	2.64	1.37	1.59	1.55	1.02	0.71	0.86	0.71	14.72	18
Duluth, Minn.	1.16	1.17	1.52	2.22	3.81	5.18	3.91	3.22	4.23	2.89	1.80	1.38	32.49	17
El Paso, Tex.	0.52	0.46	0.45	0.20	0.32	0.49	2.16	1.89	1.22	1.15	0.47	0.56	9.89	14
Fetterman, Fort, Wyo.	0.46	0.67	1.19	1.68	2.51	1.26	1.59	0.96	1.14	1.00	0.80	0.87	14.13	13
Hatteras, N. C.	6.28	4.75	5.32	4.95	4.14	4.50	6.46	6.65	6.73	6.55	5.41	6.32	68.06	13
Helena, Mont.	1.36	0.66	0.60	1.17	1.44	2.21	0.96	0.70	1.17	0.84	0.50	1.03	12.53	11
Leavenworth, Kans.	1.37	1.49	2.17	3.48	5.03	5.34	4.51	3.80	3.69	3.72	2.20	1.61	38.41	18
Maginnis, Fort, Mont.	1.74	1.32	1.64	1.17	1.49	2.79	0.90	1.40	1.34	1.12	0.82	0.68	16.41	8
Manhattan, Kans.	0.68	0.88	1.23	2.73	4.66	4.44	4.12	3.55	3.41	3.06	1.48	0.78	31.62	18
Nash Bay, Wash.	18.00	13.72	12.28	5.95	5.32	4.23	2.23	2.83	6.35	8.41	12.10	15.85	107.27	12
North Platte, Nebr.	0.41	0.36	0.56	1.96	2.91	3.34	2.59	2.47	1.88	0.97	0.49	0.62	18.56	12
Omaha, Nebr.	0.58	0.77	1.42	3.23	4.62	5.75	5.30	3.45	3.62	3.00	1.31	1.04	34.00	18
Poplar River, Mont.	0.66	0.41	0.33	0.58	1.52	2.37	1.52	0.96	0.84	0.83	0.89	0.55	11.46	9
Portland, Oregon	7.25	6.83	6.53	3.47	2.70	1.64	0.64	0.63	1.78	3.94	6.56	8.31	50.28	18
Riley, Fort, Kans.	0.45	0.82	0.88	2.09	3.47	3.98	4.13	3.39	2.90	1.89	1.30	0.71	26.01	18
Rio Grande, Tex.	0.87	0.69	0.96	0.81	2.51	1.80	1.24	2.82	3.98	1.64	1.08	1.18	19.58	17
Salt Lake City, Utah.	1.60	1.68	1.95	2.57	2.46	0.82	0.59	1.08	0.93	1.58	1.49	1.40	18.15	16
Santa Fe, N. Mex.	0.50	0.61	0.57	0.63	0.97	1.68	2.82	3.10	1.73	1.07	0.73	0.78	15.19	16
Shaw, Fort, Mont.	0.73	0.49	0.46	0.88	2.05	1.97	1.07	0.82	0.83	0.63	0.48	0.60	11.01	17
Sill, Fort, Ind. T.	0.78	1.30	1.50	2.42	4.83	4.23	3.06	3.10	3.09	2.74	1.28	1.93	30.26	18
St. Louis, Mo.	2.14	2.80	2.90	3.41	3.97	4.77	3.72	2.62	3.41	2.84	2.78	2.50	37.86	18
St. Paul, Minn.	1.09	0.96	1.49	2.24	3.35	4.52	3.28	3.92	3.43	2.02	1.33	1.27	28.90	18
Washakie, Fort, Wyo.	0.62	0.31	0.61	1.55	2.53	1.08	0.73	0.53	0.32	1.39	0.17	0.42	10.56	9
Winnemucca, Nev.	1.18	0.99	1.08	0.87	0.84	0.69	0.19	0.07	0.21	0.72	0.92	1.08	8.84	18
Yuma, Ariz.	0.36	0.41	0.24	0.08	0.03	0.01	0.21	0.77	0.15	0.13	0.31	0.41	3.11	18
CANADIAN STATIONS.														
Calgary	0.57	0.76	0.76	0.62	1.49	2.34	2.58	1.77	0.90	0.36	0.35	0.78	13.28	7
Churchill, Fort	0.00	0.20	0.35	1.04	1.10	1.03	2.72	2.10	3.90	1.36	1.14	0.30	15.14	2
Edmonton	0.73	0.46	0.65	0.57	1.60	2.19	3.10	1.83	1.49	0.57	0.22	0.40	13.81	8
Medicine Hat	0.33	0.44	0.61	0.51	1.16	3.03	1.72	0.99	0.85	0.44	0.33	0.36	10.77	9
Minnedosa	0.63	0.98	0.66	1.12	1.64	3.79	2.54	1.86	1.42	1.56	0.80	0.73	17.73	11
Port Arthur	0.81	1.33	1.17	1.37	2.18	2.81	3.01	2.37	3.47	2.69	1.98	0.85	24.04	11
Qu'Appelle	0.38	0.67	0.64	1.06	1.52	3.35	2.45	1.47	1.14	1.02	0.60	0.64	14.91	9
Swift Current	0.54	0.65	0.74	1.16	1.47	3.55	2.12	1.74	1.13	1.21	0.51	0.71	15.53	6
Winnipeg	0.66	1.17	1.02	1.35	2.82	3.84	3.22	3.46	2.00	1.73	0.99	1.19	23.45	12
York Factory	0.87	0.37	0.87	0.76	3.41	4.22	5.60	4.04	5.06	2.72	1.85	1.76	31.53	5

APPENDIX No. 7.

Monthly and annual amounts and averages of unmelted snow, in inches, at stations in North Dakota.

FORT ABRAHAM LINCOLN, N. DAK.

[An asterisk (*) indicates doubtful record. T indicates a trace of precipitation.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1874	3.00	-----	1.30	-----	-----	-----	-----	-----	-----	1.20	16.00	0.20	21.70
1875	0.80	3.20	2.10	-----	-----	-----	-----	-----	-----	1.10	0.60	-----	7.80
1876	1.20	3.40	3.40	-----	-----	-----	-----	-----	-----	-----	5.10	6.40	19.50
1877	4.60	2.30	13.70	-----	-----	-----	-----	-----	-----	-----	-----	12.00	32.60
1878	-----	12.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.40	15.40
1879	1.40	2.40	0.70	-----	-----	-----	-----	-----	-----	-----	0.40	10.40	15.30
1881	-----	10.00	4.00	-----	-----	-----	-----	-----	-----	-----	5.00	-----	19.00
1882	-----	1.00	13.00	-----	-----	-----	-----	-----	-----	-----	4.00	4.50	22.50
1883	11.00	19.20	3.50	-----	-----	-----	-----	-----	-----	1.50	1.50	17.40	54.10
1884	10.00	6.80	7.20	-----	-----	-----	-----	-----	-----	1.50	2.80	16.00	44.30
1885	10.00	4.00	9.00	-----	-----	-----	-----	-----	-----	-----	4.00	2.50	29.50
1886	4.70	0.70	8.80	-----	-----	-----	-----	-----	-----	-----	4.00	1.20	19.40
1887	11.80	4.00	4.50	-----	-----	-----	-----	-----	-----	0.60	3.40	9.00	33.30
1888	9.00	4.90	5.00	-----	-----	-----	-----	-----	-----	-----	5.00	3.00	26.90
1889	1.00	4.50	0.50	-----	4.50	-----	-----	-----	-----	-----	1.00	6.00	17.50
1890	1.00	1.00	3.00	1.00	3.00	-----	-----	-----	-----	-----	0.75	2.95	12.70
Means	5.35	5.29	5.31	-----	3.75	-----	-----	-----	-----	1.18	3.82	6.78	31.48

BISMARCK, N. DAK.

1885	3.07	3.05	1.96	0.27	0.17	-----	-----	-----	-----	-----	6.04	4.03	17.69
1886	7.06	5.05	10.04	-----	-----	-----	-----	-----	-----	-----	11.00	8.02	41.17
1887	9.07	5.00	7.06	1.02	3.00	-----	-----	-----	-----	0.04	0.04	7.02	32.25
1888	11.02	5.05	8.03	0.01	-----	-----	-----	-----	-----	-----	2.31	4.60	31.02
1889	7.28	15.07	1.03	0.01	6.00	-----	-----	-----	-----	T	1.05	6.05	36.49
1890	8.30	4.00	0.49	0.02	0.50	-----	-----	-----	-----	-----	1.00	2.33	16.64
1891	0.63	5.91	11.40	5.06	0.03	-----	-----	-----	-----	0.03	10.04	4.08	37.18
Means	6.63	6.16	5.59	1.06	1.94	-----	-----	-----	-----	0.02	4.50	5.16	31.06

FORT BUFORD, N. DAK.

1867	-----	7.00	1.00	-----	-----	-----	-----	-----	-----	-----	5.80	11.30	25.10
1868	2.60	1.30	-----	-----	-----	-----	-----	-----	-----	-----	1.30	3.90	9.10
1869	-----	1.80	1.80	-----	-----	-----	-----	-----	-----	-----	5.50	-----	9.10
1870	3.20	10.30	2.20	-----	-----	-----	-----	-----	-----	-----	3.00	0.30	21.50
1871	2.10	1.90	2.40	-----	-----	-----	-----	-----	-----	-----	5.00	10.00	35.40
1872	13.50	-----	14.80	-----	-----	-----	-----	-----	-----	-----	10.40	15.70	54.40
1873	9.80	*13.50	*22.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	*75.80
1874	1.50	2.00	2.50	-----	-----	-----	-----	-----	-----	-----	1.00	8.30	18.30
1875	7.10	11.20	7.30	-----	-----	-----	-----	-----	-----	-----	1.00	2.00	28.60
1876	1.30	1.20	0.90	-----	-----	-----	-----	-----	-----	-----	2.20	1.30	6.90
1877	3.10	-----	0.40	-----	-----	-----	-----	-----	-----	-----	17.50	2.00	23.00
1878	-----	0.50	9.50	-----	-----	-----	-----	-----	-----	-----	5.00	12.60	27.60
1879	-----	17.11	2.00	-----	-----	-----	-----	-----	-----	-----	1.00	-----	20.11
1881	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.50	3.60	*4.80
1882	2.60	2.90	5.40	-----	-----	-----	-----	-----	-----	-----	2.60	2.70	16.20
1883	19.40	3.60	9.10	-----	-----	-----	-----	-----	-----	-----	1.70	17.50	58.90
1884	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.40	18.00	*35.07
1885	8.02	26.01	0.08	5.01	-----	-----	-----	-----	-----	-----	4.07	2.02	45.21

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual amounts and averages of unmelted snow at stations in North Dakota—Cont'd.

FORT BUFORD, N. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1886	8.05	11.09	7.09	0.00	-----	-----	-----	-----	-----	-----	7.00	11.11	44.34
1887	11.05	3.10	2.06	8.00	-----	-----	-----	-----	-----	11.05	2.06	6.00	43.32
1888	8.07	6.08	9.04	6.08	-----	-----	-----	-----	-----	1.04	1.04	1.04	32.39
1889	3.09	3.07	5.06	T	13.05	-----	-----	-----	-----	-----	5.06	4.07	33.40
1890	4.08	3.09	5.09	3.05	2.06	-----	-----	-----	-----	-----	T	1.03	18.40
1891	2.05	3.03	4.00	1.06	T	-----	-----	-----	-----	14.00	12.07	0.09	36.30
Means	6.14	7.99	5.44	3.31	5.04	-----	-----	-----	-----	4.72	6.49	5.37	44.50

FORT PEMBINA, N. DAK.

1871	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.36	7.40	*12.76
1872	2.80	2.50	4.50	-----	-----	-----	-----	-----	-----	-----	5.30	2.95	18.05
1873	4.10	7.50	-----	-----	-----	-----	-----	-----	-----	-----	6.60	1.80	20.00
1874	2.60	2.50	-----	-----	-----	-----	-----	-----	-----	-----	3.00	1.20	9.30
1875	0.40	0.30	-----	-----	-----	-----	-----	-----	-----	-----	2.30	1.50	4.50
1876	1.40	5.50	-----	-----	-----	-----	-----	-----	-----	-----	6.40	6.20	19.50
1877	0.70	3.10	-----	-----	-----	-----	-----	-----	-----	-----	2.20	0.30	6.30
1878	0.50	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.40	2.90	7.90
1879	2.20	4.00	-----	-----	-----	-----	-----	-----	-----	-----	2.50	9.00	17.70
1880	2.60	5.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.60	15.20
1881	5.60	14.00	-----	-----	-----	-----	-----	-----	-----	-----	7.00	5.00	31.60
1882	10.80	6.20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	*17.00
1883	2.00	0.00	-----	-----	-----	-----	-----	-----	-----	-----	5.50	17.20	24.70
1884	1.00	8.00	-----	-----	-----	-----	-----	-----	-----	-----	22.50	*26.20	*57.70
1885	5.00	2.00	-----	-----	-----	-----	-----	-----	-----	-----	8.70	10.50	26.20
1886	22.50	*45.90	-----	-----	-----	-----	-----	-----	-----	-----	*38.00	17.00	*123.40
1887	16.00	*41.00	-----	-----	-----	-----	-----	-----	-----	-----	3.30	7.60	*67.90
1888	17.00	2.40	9.80	3.30	-----	-----	-----	-----	-----	-----	3.50	4.85	40.85
1889	3.40	4.80	3.20	3.00	-----	-----	-----	-----	-----	-----	1.75	10.25	26.40
1890	5.43	2.42	2.78	-----	3.42	-----	-----	-----	-----	-----	2.54	1.50	18.09
Means	5.58	8.38	5.07	3.15	-----	-----	-----	-----	-----	-----	7.16	7.42	36.76

FORT RANSOM, N. DAK.

1867	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.80	2.50	*7.60
1869	-----	1.80	6.10	3.40	-----	-----	-----	-----	-----	-----	0.20	4.20	15.60
1870	18.40	5.80	13.80	2.40	-----	-----	-----	-----	-----	-----	4.50	9.10	44.80
1871	4.30	5.70	15.10	19.20	-----	-----	-----	-----	-----	0.20	-----	-----	58.10
1872	13.30	9.60	11.00	13.00	-----	-----	-----	-----	-----	-----	-----	-----	46.90
Means	12.00	5.72	11.50	9.50	-----	-----	-----	-----	-----	-----	2.17	5.85	46.74

FORT RICE, N. DAK.

1868	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.00	6.90	*6.90
1869	0.40	5.00	3.60	-----	-----	-----	-----	-----	-----	-----	6.80	1.30	13.60
1870	4.60	0.60	4.40	-----	-----	-----	-----	-----	-----	-----	3.40	-----	17.50
1871	2.90	0.20	4.40	-----	-----	-----	-----	-----	-----	-----	3.40	3.40	10.90
1872	15.00	-----	6.10	-----	-----	-----	-----	-----	-----	3.00	2.50	-----	27.90
1873	7.20	16.60	5.60	-----	-----	-----	-----	-----	-----	5.00	14.70	3.20	34.90
1874	17.60	-----	3.50	-----	-----	-----	-----	-----	-----	2.00	5.10	1.80	44.00
1875	3.80	13.80	4.10	-----	-----	-----	-----	-----	-----	-----	-----	-----	30.60
1876	1.40	13.00	5.60	-----	-----	-----	-----	-----	-----	-----	7.10	16.90	20.00
1877	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.10	-----	-----	*24.00
1878	1.90	10.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	*16.00
Means	6.09	8.46	4.66	-----	-----	-----	-----	-----	-----	3.52	6.00	5.58	34.31

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual amounts and averages of unmelted snow at stations in North Dakota—Cont'd.

RICHARDSON, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884		9.00	3.50	10.10							*44.00	*47.10	*113.70
1885	*44.00	0.00								1.70	2.50		48.20
1886	*29.50	*22.00	*26.00	0.10						2.20	15.00	13.50	*108.30
1887	19.00		11.00							2.75	5.25	19.00	57.00
1888	17.50	18.75	15.50										*51.75
Means	27.50	12.44	14.00	5.10						2.48	16.49	20.52	98.53

FORT SEWARD, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1873	3.40	3.20	2.00								1.10	2.50	12.20
1874	3.80	2.00	0.90								1.30		8.00
1875	0.40	1.40	1.00								1.00	0.60	4.40
1876	0.60	1.60	20.00									1.50	23.70
1877	0.40		0.70									1.00	2.10
Means	1.72	2.05	4.92								1.13	1.40	11.22

FORT STEVENSON, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1867											6.70	9.70	16.40
1868		0.20									0.00	6.50	6.70
1870	5.00	0.20									0.00	3.70	8.90
1871	7.60	8.00									17.80	7.90	41.30
1872	11.50	0.60									3.10	7.00	22.20
1873	1.70	6.00									0.30	0.40	8.40
1874	0.20	0.00									1.00	0.20	1.40
1875	1.40	5.40									7.30	2.00	16.10
1876	11.50	10.00									7.70	1.10	30.30
1877	2.10	0.20									1.40	0.50	4.20
1878	0.00	1.80									0.00	4.00	5.80
1879	0.00	0.20									7.10	*67.60	*75.00
1880		20.20									0.60	9.70	30.40
1881	4.70	4.80									4.00	2.00	15.50
1882	2.10	4.30									1.90	8.00	16.30
1883	6.40	1.20											*7.60
Means	4.17	4.21									3.93	8.69	21.00

FORT TOTTEN, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1869											4.00		*4.00
1870		0.10	10.00							10.20		2.40	22.60
1871	18.00	7.40	9.00								7.30	11.20	52.90
1872	7.40	2.60	3.40							7.80	6.40	1.90	29.50
1873	11.60	13.20	8.70								5.50	0.50	39.50
1874	3.80	0.30	0.90								14.10	1.90	21.00
1875	5.10	8.00	2.40							2.60	7.50	3.80	29.40
1876	1.20	4.20	15.20								5.30	4.80	30.70
1877	2.00		9.00								0.80	2.00	13.80
1878		3.00									5.60	7.00	17.60
1879	1.70	7.00	0.10							0.30	2.00	14.40	25.40
1880		0.60	3.00									4.80	8.40
1881	1.60	13.40	2.80							2.40	5.00		25.20
1882	4.80	0.30	20.40							5.30	6.30	0.40	37.50
1883	9.20	7.90	1.90								7.30	*28.40	*54.70
1884	6.80	5.40	9.80							1.60	2.50	6.30	32.40
1885	3.00	3.00	1.05	8.04	0.07					5.07	8.04	5.03	33.30
1886	12.03	8.08	8.04	0.07						0.04	7.03	4.03	39.32
1887	6.08	5.02	6.03	1.05	0.09					1.00	3.09	6.00	28.36
1888	5.07	T	7.00	1.00	T					1.00	2.00	1.00	17.07
1889	2.00	7.25	1.90	1.70							2.25		15.10
1890	3.00	5.00	3.40		2.25								*13.65
Means	5.80	5.09	6.20	2.37	0.80					3.58	5.44	5.60	34.88

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual amounts and averages of unmelted snow at stations in North Dakota—Cont'd.

FORT YATES, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1882	5.00	1.00	10.00								2.70	1.40	20.10
1883	2.80	0.80	1.40									4.30	9.30
1884	2.30	3.50	0.90								5.40	5.00	17.10
1885	4.20	3.40	1.40								1.40	2.80	13.20
1886	2.60	1.60	6.80								5.80	16.00	32.80
1887	8.60	8.60	17.00								1.90		36.10
1888	8.70	1.60	4.00								1.00	2.00	17.30
1889	4.50	6.00	1.50								0.20	2.40	14.60
1890	2.80	5.60	1.20	0.40	1.20				T		0.90	3.90	16.00
Means	4.61	3.57	4.91								2.41	4.72	20.22

Monthly and annual amounts and averages of unmelted snow, in inches, at stations in South Dakota.

[An asterisk (*) indicates doubtful record. T indicates a trace of precipitation.]

ALEXANDRIA, S. DAK.

1882			6.50								1.51	2.70	10.71
1883	2.10	11.00	8.60	11.30						1.00		6.60	40.60
1884	2.20	10.40											12.60
Means	2.15	10.70	7.55									4.65	25.05

FORT BENNETT, S. DAK.

1884											0.46	0.17	0.63
1885	0.14	3.20	1.10								8.50		12.94
1886		4.05									3.00	5.50	12.55
1889											5.75	2.50	13.75
1890	0.50	3.50	1.50										
Means	0.32	3.58	1.30								4.43	2.72	12.35

DEADWOOD, S. DAK.

1883	0.74	1.32										2.42	12.90	2.06
1884	8.50	10.10	2.61								6.40	4.70	22.10	36.52
1885	9.90	11.10	14.20								0.20	*28.80	17.60	71.40
1886	17.50	18.80	25.10	7.60							13.10	5.00	18.30	*115.60
1887	35.80	7.80	20.60	45.10										*145.70
Means	14.49	10.42	15.63	26.35							6.57	10.23	17.72	99.41

FIRESTEEL, S. DAK.

1875		8.00	5.00								2.25	1.25	16.50
1876	5.00	6.50									5.00	5.00	43.50
1877	6.00		11.50										17.50
Means	5.50	7.25	12.83								3.62	3.12	32.32

FORT HALE, S. DAK.

1879	1.40	0.80	2.00									0.60	8.20	12.40
1880	2.20	6.00	3.40									6.40		23.40
1881	15.00	*30.80	15.50									2.80	1.10	*66.70
1882	6.00	4.80	8.60										4.00	23.30
1883	7.10	14.50	12.11											37.71
1884	1.60	7.60	8.00											17.20
Means	5.55	10.75	8.27									3.27	6.12	33.96

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual amounts and averages of unmelted snow at stations in South Dakota—Cont'd.

HENRY, S. DAK.

[illegible]

HURON, S. DAK.

1885	1.00	2.00	0.00						0.06	0.70	3.76
1886	3.75	1.35	4.70						3.20	4.90	17.90
1887	3.10	7.90	5.10						1.70	15.50	33.30
1888	5.75	3.30	8.70	T						1.20	18.95
1889	15.10	11.10	T	T					0.50	14.35	41.05
1890	6.20	1.70	1.70	0.00	T				3.50	6.70	19.80
1891	0.50	12.60	15.50	T	0.60				7.50	2.40	39.10
Means	5.06	5.71	5.10	T	0.30				2.74	6.54	25.45

LOWER BRULE AGENCY, S. DAK.

1875										0.60	2.20	2.80
1876	2.20	2.70	5.70							0.70	1.40	12.70
1877	3.20	0.00	3.20							2.00	1.50	9.90
1878	0.50	1.00							0.70		0.20	2.40
Means	1.97	1.23	4.45							1.10	1.32	10.07

FORT MEADE, S. DAK.

1879													
1880	3.80	10.00	9.20								0.40	8.90	9.30
1881	5.60	5.40	5.10							1.00	4.40	3.90	32.30
1882	1.00	1.00	1.00							6.30	4.60		27.00
1883	*29.00	3.00	20.00							0.90	0.50	0.60	5.00
1884	3.70	3.30	14.60								0.50	2.00	*54.50
1885	3.20	2.30	4.90								2.50	9.00	33.10
1886	2.50	3.80	7.00							0.20	0.50	0.80	11.90
1887	5.60	2.00	6.60								16.00	4.20	33.50
1888	0.00	11.50	5.20	0.70						4.00	1.00	3.60	22.80
1889	2.70	8.50	1.20								1.60	1.70	20.70
1890	8.20	2.27	8.70	7.10	4.00						7.00	6.92	26.32
											12.00	1.00	43.27
Means	5.94	4.82	7.59	3.90						2.48	4.25	3.87	32.85

MORRISON, S. DAK.

1877													
1878	4.50	2.50	1.00							2.50	8.50	11.00	
1879	1.00	3.00	4.00							4.50	10.00	22.50	
1880	2.50	10.00	6.00	4.00							9.00	18.00	
1881	13.00	16.00	15.00						12.00	0.50	6.50	41.00	
1882	6.00	7.00	7.00							4.00	1.50	49.50	
1883	6.00	4.00	11.00	4.50						1.00	4.00	25.00	
1884			9.00	9.00								25.50	
												18.00	
Means	5.50	7.08	7.57	5.83						2.50	6.58	35.06	

OLIVET, S. DAK.

[illegible]

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual amounts and averages of unmelted snow at stations in South Dakota—Cont'd.

OLIVET, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1880	4.10	-----	11.00	2.50	-----	-----	-----	-----	-----	7.00	-----	11.02	35.62
1881	17.25	26.25	16.50	14.75	-----	-----	-----	-----	-----	-----	3.00	1.50	*79.25
1882	3.40	6.75	4.00	4.00	-----	-----	-----	-----	-----	-----	1.00	-----	19.15
Means	7.65	10.39	7.20	7.06	-----	-----	-----	-----	-----	3.60	2.17	8.33	46.49

FORT RANDALL, S. DAK.

1860	-----	3.20	-----	-----	-----	-----	-----	-----	-----	-----	0.40	0.80	4.40
1861	3.70	1.00	1.00	-----	-----	-----	-----	-----	-----	-----	3.60	5.40	14.70
1862	5.60	2.70	7.10	-----	-----	-----	-----	-----	-----	-----	2.00	1.00	18.70
1863	1.40	2.00	-----	-----	-----	-----	-----	-----	-----	-----	2.40	6.80	12.60
1864	2.00	-----	2.40	-----	-----	-----	-----	-----	-----	-----	-----	-----	*4.40
1865	-----	-----	2.20	-----	-----	-----	-----	-----	-----	-----	-----	-----	*2.20
1866	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	15.00	1.40	*16.40
1867	5.90	6.30	7.60	-----	-----	-----	-----	-----	-----	-----	-----	1.20	21.00
1868	7.40	4.80	9.40	-----	-----	-----	-----	-----	-----	-----	2.80	3.20	27.60
1869	-----	0.80	0.30	-----	-----	-----	-----	-----	-----	-----	5.00	3.40	9.50
1870	3.50	-----	6.10	-----	-----	-----	-----	-----	-----	-----	-----	1.20	10.80
1871	0.50	6.60	1.00	-----	-----	-----	-----	-----	-----	-----	0.80	2.10	11.00
1872	-----	-----	0.30	-----	-----	-----	-----	-----	-----	-----	1.10	0.60	*2.00
1873	4.70	16.60	1.50	-----	-----	-----	-----	-----	-----	-----	0.50	2.40	25.70
1874	1.10	2.10	5.10	-----	-----	-----	-----	-----	-----	-----	0.50	7.60	16.40
1875	7.20	4.20	7.70	-----	-----	-----	-----	-----	-----	-----	-----	1.00	20.10
1876	4.70	7.50	24.90	-----	-----	-----	-----	-----	-----	-----	2.00	5.00	*44.10
1877	-----	-----	5.50	-----	-----	-----	-----	-----	-----	-----	5.00	8.00	18.50
1878	3.00	3.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	10.10	16.60
1879	-----	2.20	5.40	-----	-----	-----	-----	-----	-----	-----	-----	20.50	28.10
1880	10.60	18.70	16.10	-----	-----	-----	-----	-----	-----	-----	-----	-----	*45.40
1881	1.00	13.00	12.00	-----	-----	-----	-----	-----	-----	-----	6.00	1.00	33.00
1882	2.00	20.00	15.00	-----	-----	-----	-----	-----	-----	-----	-----	*22.00	*59.00
1883	8.00	17.00	*23.00	-----	-----	-----	-----	-----	-----	-----	-----	7.10	*55.10
1884	5.80	4.70	4.00	-----	-----	-----	-----	-----	-----	-----	-----	10.80	25.30
1885	2.00	4.20	1.00	-----	-----	-----	-----	-----	-----	-----	14.80	1.20	23.20
1886	4.10	3.20	15.00	-----	-----	-----	-----	-----	-----	-----	6.90	3.20	32.10
1887	2.40	5.80	1.80	-----	-----	-----	-----	-----	-----	-----	14.80	42.10	66.90
1888	4.00	3.80	8.80	-----	-----	-----	-----	-----	-----	-----	-----	6.62	23.22
1889	6.00	2.60	-----	-----	-----	-----	-----	-----	-----	-----	11.00	4.00	23.60
1890	6.00	1.20	9.10	-----	-----	-----	-----	-----	-----	-----	6.00	0.50	22.80
Means	4.28	6.31	7.45	-----	-----	-----	-----	-----	-----	-----	5.29	6.44	29.77

RAPID CITY, S. DAK.

1888	3.03	16.02	15.01	T	10.00	-----	-----	-----	-----	-----	5.00	6.00	55.04
1889	6.25	13.50	1.09	6.05	1.03	-----	-----	-----	-----	0.10	3.06	2.05	33.13
1890	4.06	4.05	10.06	2.05	2.05	-----	-----	-----	-----	-----	3.01	2.00	27.28
1891	2.90	13.05	12.00	1.00	2.00	-----	-----	-----	-----	0.03	0.05	0.03	31.06
Means	4.06	11.66	9.54	2.28	3.77	-----	-----	-----	-----	0.06	2.78	2.52	36.67

FORT SISSETON, S. DAK.

1869	2.00	14.70	1.20	-----	-----	-----	-----	-----	-----	-----	3.60	0.70	22.20
1870	4.80	2.50	3.50	-----	-----	-----	-----	-----	-----	-----	5.20	3.20	14.00
1871	4.40	3.00	10.80	-----	-----	-----	-----	-----	-----	-----	5.60	2.00	25.40
1872	2.00	2.20	6.40	-----	-----	-----	-----	-----	-----	-----	11.60	1.60	17.80
1873	*21.40	11.16	11.70	-----	-----	-----	-----	-----	-----	-----	26.00	*42.40	*69.66
1874	11.18	24.00	*35.00	-----	-----	-----	-----	-----	-----	-----	3.00	1.40	*138.58
1875	*28.40	*63.00	*45.00	-----	-----	-----	-----	-----	-----	-----	-----	8.20	*140.80
1876	8.80	5.40	8.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	30.40
1877	6.60	-----	12.20	-----	-----	-----	-----	-----	-----	-----	-----	6.20	18.80
1878	1.40	-----	1.20	-----	-----	-----	-----	-----	-----	-----	-----	8.00	8.80
1879	0.80	8.00	2.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	18.80

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual amounts and averages of unmelted snow at stations in South Dakota—Cont'd.

FORT SISSETON, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1880	3.00	2.20	-----	-----	-----	-----	-----	-----	-----	-----	1.20	2.00	8.40
1881	5.60	-----	*20.00	-----	-----	-----	-----	-----	-----	-----	2.60	1.20	*29.40
1882	3.60	3.20	-----	-----	-----	-----	-----	-----	-----	-----	7.00	1.90	15.70
1883	1.30	2.20	0.10	-----	-----	-----	-----	-----	-----	-----	-----	3.00	6.60
1884	3.50	8.20	4.40	-----	-----	-----	-----	-----	-----	-----	5.20	13.10	24.40
1885	4.80	1.50	4.00	-----	-----	-----	-----	-----	-----	-----	*17.00	7.50	*34.80
1886	6.00	6.50	5.50	-----	-----	-----	-----	-----	-----	-----	4.60	3.20	25.80
1887	4.00	4.60	4.20	-----	-----	-----	-----	-----	-----	-----	-----	13.70	26.50
1888	2.50	1.70	5.90	-----	-----	-----	-----	-----	-----	-----	-----	-----	10.10
1889	4.60	3.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.10
Means	6.22	9.31	10.06	-----	-----	-----	-----	-----	-----	-----	7.72	7.39	40.70

FORT SULLY, S. DAK.

1868	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.50	*1.50
1869	0.80	5.00	0.60	-----	-----	-----	-----	-----	-----	-----	4.00	4.00	14.40
1870	5.00	5.50	22.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	33.00
1871	9.00	15.00	*46.00	-----	-----	-----	-----	-----	-----	-----	1.00	1.10	*72.10
1872	-----	1.00	2.50	-----	-----	-----	-----	-----	-----	-----	8.70	3.80	16.00
1873	8.40	1.70	3.00	-----	-----	-----	-----	-----	-----	1.50	-----	2.50	17.10
1874	3.50	1.80	0.80	-----	-----	-----	-----	-----	-----	3.50	4.40	0.80	14.80
1875	4.40	5.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.50	11.40
1876	0.80	5.30	2.50	-----	-----	-----	-----	-----	-----	-----	3.90	5.00	17.50
1877	10.10	0.30	16.00	-----	-----	-----	-----	-----	-----	-----	4.10	9.70	30.20
1878	0.20	2.50	-----	-----	-----	-----	-----	-----	-----	3.50	1.00	5.60	12.80
1879	1.50	1.60	1.40	-----	-----	-----	-----	-----	-----	-----	0.30	5.60	10.40
1880	8.80	6.50	9.00	-----	-----	-----	-----	-----	-----	-----	1.40	5.60	31.30
1881	3.30	*13.60	5.40	-----	-----	-----	-----	-----	-----	1.80	3.10	-----	*27.10
1882	2.30	0.90	2.50	-----	-----	-----	-----	-----	-----	-----	1.10	0.30	7.10
1883	1.70	4.40	1.90	-----	-----	-----	-----	-----	-----	-----	-----	2.60	10.60
1884	2.90	4.70	2.90	-----	-----	-----	-----	-----	-----	-----	0.20	6.30	17.00
1885	1.80	1.40	1.50	-----	-----	-----	-----	-----	-----	0.30	1.20	1.00	7.20
1886	4.07	2.01	12.01	3.00	-----	-----	-----	-----	-----	-----	8.03	5.20	34.32
1887	-----	2.00	0.00	-----	-----	-----	-----	-----	-----	0.08	1.01	5.07	8.16
1888	5.08	2.08	5.04	T	-----	-----	-----	-----	-----	-----	0.05	6.00	18.25
1889	10.60	6.03	T	-----	-----	-----	-----	-----	-----	-----	3.00	6.03	25.66
1890	2.08	4.01	2.01	0.00	0.00	-----	-----	-----	-----	-----	6.24	5.10	19.44
1891	3.10	8.50	2.70	0.20	0.40	-----	-----	-----	-----	-----	-----	-----	14.90
Means	4.26	4.41	6.68	0.80	0.20	-----	-----	-----	-----	1.78	2.93	4.01	25.07

VERMILLION, S. DAK.

1883	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.75	*3.75
1884	-----	5.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.00	16.00
1885	1.00	3.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.00	7.00
1886	4.00	5.50	*25.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	*34.50
Means	2.50	4.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.92	12.92

WEBSTER, S. DAK.

1883	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.20	*8.20
1884	5.04	18.05	20.65	0.55	0.00	-----	-----	-----	-----	0.12	2.36	6.72	53.49
1885	0.45	0.05	4.90	0.45	1.80	-----	-----	-----	-----	0.00	6.70	2.22	16.57
1886	0.22	7.88	7.20	4.35	0.00	-----	-----	-----	-----	0.10	*12.95	8.42	*41.12
1887	*16.05	*16.52	6.60	1.60	0.00	-----	-----	-----	-----	0.25	0.50	*14.50	*56.02
1888	8.45	5.93	11.46	0.25	-----	-----	-----	-----	-----	0.60	0.10	1.72	28.51
1889	10.43	*12.03	6.25	0.10	-----	-----	-----	-----	-----	0.65	0.98	8.90	*39.34
1890	6.63	2.45	5.35	-----	-----	-----	-----	-----	-----	0.30	9.00	7.55	31.28
Means	6.75	8.99	8.92	1.22	0.45	-----	-----	-----	-----	0.29	4.66	7.28	38.56

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual amounts and averages of unmelted snow at stations in South Dakota—Cont'd.

YANKTON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	1.05	4.01	1.05	0.01							0.00	13.09	19.21
1886	5.06	5.03	23.06								*29.08	5.06	*67.29
1887	4.00	1.02	1.05	0.02							4.05	18.01	28.15
1888	*16.08	4.00	11.04	3.00							0.03	3.03	*37.18
1889	2.09	1.08	2.02								3.04	1.07	9.30
1890	8.04	4.08	10.00	0.00							5.05	3.00	30.17
1891	6.07	13.08	9.05								2.03	10.40	*40.63
Means	6.06	4.61	8.18	0.76							6.18	7.67	33.46

Monthly and annual amounts and averages of unmelted snow, in inches, at two stations in Minnesota.

MOORHEAD, MINN.

[An asterisk (*) indicates doubtful record. ○ indicates no record. T indicates a trace of precipitation.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884	0.55												*0.55
1885	0.02	2.05	3.02	12.01	2.00						4.03	3.00	26.13
1886	8.06	6.06	1.03	1.06							*20.77	7.05	*44.03
1887	8.05	8.00	3.50	2.80						0.10	3.25	20.20	*45.90
1888	*12.05	4.70	11.05	0.25						0.06	0.00	1.22	*29.27
1889	12.32	9.70	2.50	0.10							1.70	1.01	27.33
1890	2.02	3.03	5.09	0.03	3.04				0.05	T	4.00	1.08	18.34
1891	8.03	13.00	14.01	2.00						0.25	5.02	5.00	*47.31
Means	6.39	6.65	5.74	2.61	2.52				0.05	0.10	5.54	5.51	35.11

ST. VINCENT, MINN.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	3.09	1.05	5.06	*18.02	2.01					1.02	12.09	5.03	47.37
1886	9.00	7.01	3.08	2.03					1.01	0.00	1.00	2.08	25.21
1887	6.07	*15.50	4.09	2.05						0.00	2.04	6.00	*35.75
1888	9.06	2.00	9.06	3.01						0.07	2.06	5.06	30.32
1889	8.04	10.05	3.05	3.00					T	T	9.00	*23.06	*56.20
1890	16.40	6.01	8.08	T	4.05				3.00	8.00	2.00	2.05	49.59
1891	○	○	○	○	1.00					1.00	8.00	18.00	*28.00
Means	8.61	6.94	5.40	4.68	2.35				1.00	1.44	5.17	8.75	44.34

APPENDIX No. 8.

Amounts of unmelted snow, in inches, on ground at end of month at stations in North Dakota.

BISMARCK, N. DAK.

[An asterisk (*) indicates doubtful record. T indicates a trace of precipitation.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884	4.00												
1885	4.00	2.00	0.00								0.00	2.04	
1886	2.05	2.02	0.00								4.00	7.07	
1887	9.08	3.00	0.00								0.02	4.00	
1888	9.00	6.00	3.00								0.00	2.00	
1889	0.00	0.00	0.00								0.00	3.00	
1890	4.00	3.00	0.00								0.00	0.33	
1891	0.00	0.20	0.00								5.00	2.00	
Means	4.02	2.32	0.43								1.29	2.92	

FORT BUFORD, N. DAK.

1884	8.00												
1885	7.05	5.00	T								0.00	T	
1886	6.04	4.09	0.00								2.00	11.00	
1887	*24.03	12.00	T								2.00	5.00	
1888	3.03	4.07	2.02								T	1.00	
1889	1.00	T	0.00								2.00	6.02	
1890	6.03	5.03	T								T	0.00	
1891	0.25	3.00	T							4.00	3.08	4.00	
Means	6.93	4.74	0.29								1.30	3.86	

FORT TOTTEN, N. DAK.

1885	5.00	2.06	0.00								2.00	4.00	
1886	12.04	4.02	0.05								7.00	7.00	
1887	13.00	17.00	1.00								0.05	6.05	
1888	10.00	6.00	3.00								0.00	0.09	
1889	0.05												
Means	8.02	7.27	1.01								2.26	4.26	

Amounts of unmelted snow, in inches, on ground at end of month at stations in South Dakota.

FORT BENNETT, S. DAK.

[An asterisk (*) indicates doubtful record. T indicates a trace of precipitation.]

1884													
1885	0.30	0.00	0.00								6.10	0.00	
											0.00		

Amounts of unmelted snow on ground at end of month at stations in South Dakota—Continued.

DEADWOOD, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1883		0.00											
1884	5.50	8.00	5.00								0.00	5.50	
1885	4.30	6.50	0.00							1.10	0.00	2.10	
1886	2.30	2.00	0.00								6.00	8.00	
1887	*30.00	10.00	3.00	3.00							1.00	3.00	
Means	10.52	5.30	2.00								1.75	4.65	

HURON, S. DAK.

1885	2.00	0.00	0.00								0.00	0.00	
1886	3.00	1.00	0.00								3.00	4.00	
1887	7.00	6.00	0.00								1.00	15.00	
1888	15.00	1.00	1.00									1.00	
1889	8.00	3.00	0.00								0.00	8.00	
1890	10.00	2.00	0.00								0.00	0.00	
1891	0.05	7.00	1.00								1.75	2.00	
Means	6.44	3.29	0.29								0.96	4.29	

RAPID CITY, S. DAK.

1888	T	1.08	T									1.00	
1889	0.00	1.00	0.00									2.02	
1890	0.00	3.04	6.00									0.03	
1891	1.40	4.05	0.00									0.02	
Means	0.35	2.29	1.50									0.77	

FORT SULLY, S. DAK.

1886	1.05	1.03	0.00								3.00	3.00	
1887		0.00	0.00								1.00	2.00	
1888	0.05	T	T								0.00	2.00	
1889	1.00	1.00	0.00								0.00	3.00	
1890	1.00	4.00	0.00								0.00	1.50	
1891	2.10	0.80	T										
Means	1.04	1.14	T								0.80	2.75	

YANKTON, S. DAK.

1885	2.00	0.00	0.00								0.00	0.00	
1886	2.00	0.06	7.02								*13.00	4.07	
1887	1.04	0.00	0.00								0.07	5.01	
1888	4.00	0.00	0.00								0.00	0.00	
1889	0.00	0.00	0.00								0.00	2.00	
1890	0.00	2.05	3.00								0.00	0.08	
1891	2.00	2.05	0.00								0.00	3.00	
Means	1.58	0.59	1.43								1.87	2.02	

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Amounts of unmelted snow, in inches, on ground at end of month at two stations in Minnesota.

MOORHEAD, MINN.

[An asterisk (*) indicates doubtful record. T indicates a trace of precipitation.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	0.05	0.00	0.00	5.00							0.03	0.04	
1886	2.00	5.00	0.00	0.00							12.00	6.00	
1887	6.00	3.00	0.00	0.00						0.10	0.08	11.00	
1888	10.00	4.00	8.00	0.00						0.00	0.00	0.00	
1889	10.00	*12.00	0.00	0.00							0.00	1.00	
1890	0.00	2.00	0.00	0.00						0.00	0.00	1.00	
1891	1.00	5.00	0.00	0.00						0.25	3.00	1.00	
Means	4.15	4.43	1.14	0.71						0.09	2.16	2.86	

ST. VINCENT, MINN.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	10.00	4.00	3.00								3.00	4.00	
1886	12.03	8.05	0.50							0.00	6.00	2.00	
1887	8.07	16.00	2.02							0.00	2.00	5.00	
1888	7.00	12.00	9.00							0.00	0.00	0.02	
1889	6.00	8.00	0.00							0.00	1.00	*16.00	
1890	*18.00	14.00	3.00							0.00	2.00	2.00	
1891										1.00	3.00	12.00	
Means	10.18	10.34	2.92							0.17	2.43	5.86	

APPENDIX No. 9.

Monthly average number of rainy days.

[A rainy day is one on which an amount of precipitation equal to or exceeding 0.01 inch has fallen.]

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.	Length of record.
Bismarck, N. Dak.	8	9	9	9	11	12	11	8	6	7	7	9	9	Oct. 1874-Dec. 1891.
Fort Buford, N. Dak.	7	8	6	7	9	12	11	7	5	8	6	7	8	1879-1891.
Fort Totten, N. Dak.	8	7	8	8	9	14	11	9	6	8	6	9	8	June 1884-Jan. 1889.
Fort Bennett, S. Dak.	7	9	9	8	10	12	11	6	6	6	4	6	8	Oct. 1880-Nov. 1885.
Deadwood, S. Dak.	11	10	12	14	14	13	11	9	5	9	8	11	10	1878-1887.
Huron, S. Dak.	6	8	8	10	11	11	10	11	7	8	6	6	8	July 1881-Dec. 1891.
Rapid City, S. Dak.	5	9	11	9	12	13	9	10	4	7	6	5	8	1888-1891.
Fort Sully, S. Dak.	7	7	6	7	9	13	11	9	4	4	4	7	7	Jan. 1885-June 1891.
Yankton, S. Dak.	8	6	9	10	13	11	10	9	8	6	5	8	9	Apr. 1873-Dec. 1891.
Valentine, Nebr.	7	7	8	8	12	11	10	10	6	5	4	4	8	Sept. 1885-Dec. 1891.
Moorhead, Minn.	8	9	8	9	9	10	10	8	8	9	7	9	9	1881-1891.
St. Vincent, Minn.	9	8	7	7	7	10	11	8	8	8	8	8	8	Sept. 1880-Dec. 1891.
Means	8	8	8	9	10	12	10	9	6	7	6	7	8	

APPENDIX No. 10.

Percentage of probability of rainy days.

[A rainy day is one on which rain or melted snow falls to the amount of 0.01 inch or more.]

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.	Length of record.
Bismarck, N. Dak.	26	31	28	29	36	42	36	26	21	23	22	28	29	Oct. 1874-Dec. 1891.
Buford, Fort, N. Dak.	22	27	20	24	29	41	34	22	18	24	22	22	25	1879-1891.
Deadwood, S. Dak.	34	37	37	46	44	45	37	29	16	28	29	37	35	1878-1887.
Huron, S. Dak.	21	28	27	33	37	36	34	35	24	25	19	21	28	July 1881-Dec. 1891.
Moorhead, Minn.	26	31	26	32	30	35	32	26	27	28	24	29	29	1881-1891.
St. Vincent, Minn.	27	30	24	24	24	33	35	25	28	27	25	26	27	Sept. 1880-Dec. 1891.
Sully, Fort, S. Dak.	23	25	17	24	30	42	34	30	15	14	16	22	24	1885-1891.
Totten, Fort, N. Dak.	24	25	25	27	31	48	36	30	19	26	19	29	28	June 1884-Dec. 1888.
Yankton, S. Dak.	24	22	26	32	41	37	32	28	25	19	17	24	27	Apr. 1873-Dec. 1891.
Means	25	28	26	30	34	40	34	28	21	24	21	26	28	

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

APPENDIX No. 11.

Monthly average number of clear days.

[A clear day is one on which the average cloudiness, on a scale of 10, is three-tenths or less.]

Station.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.	Length of record.
Bismarck, N. Dak. . .	11	9	8	9	9	8	11	13	13	12	10	10	10	Oct. 1874-Dec. 1891.
Fort Buford, N. Dak. .	7	7	6	7	6	6	8	13	10	8	8	8	8	1879-1891.
Fort Totten, N. Dak. .	12	10	8	9	11	9	12	13	12	10	12	10	11	June 1884-Jan. 1889.
Fort Bennett, S. Dak. .	9	9	7	7	8	10	9	11	12	11	9	8	9	Oct. 1880-Nov. 1885.
Deadwood, S. Dak. . .	12	9	10	8	9	11	15	16	18	15	14	11	12	1878-1887.
Huron, S. Dak.	10	10	7	10	10	10	10	13	12	13	13	12	11	July 1881-Dec. 1891.
Rapid City, S. Dak. . .	13	6	6	10	6	6	9	9	14	11	14	13	10	1888-1891.
Fort Sully, S. Dak. . .	12	9	8	10	9	9	12	14	16	15	17	12	13	Jan. 1885-June 1891.
Yankton, S. Dak. . . .	11	9	9	10	9	10	11	13	13	12	11	10	11	Apr. 1873-Dec. 1891.
Valentine, Nebr. . . .	12	11	11	11	10	10	12	13	15	14	13	11	12	Sept. 1885-Dec. 1891.
Moorhead, Minn.	10	8	7	9	10	9	10	13	11	9	9	9	9	1881-1891.
St. Vincent, Minn. . . .	12	9	11	10	10	10	11	13	10	8	9	10	10	Sept. 1880-Dec. 1891.
Means.	11	9	8	9	9	9	11	13	13	12	12	10	10	

APPENDIX No. 12.

Average snowfall in inches. Computed from the records at all stations.

[Annual report Meteorological Service, Dominion of Canada, 1887.]

MANITOBA.

[T indicates a trace of precipitation.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1872	5.0	4.8	16.3	39.2	0.0	-----	-----	-----	-----	3.7	9.0	3.4	81.4
1873	6.2	16.4	4.0	0.4	0.0	-----	-----	-----	-----	10.6	8.9	10.9	57.4
1874	9.2	10.6	5.8	6.6	0.0	-----	-----	-----	-----	1.4	17.4	4.6	55.6
1875	4.3	3.8	1.9	5.8	T	-----	-----	-----	-----	9.2	8.4	8.2	41.6
1876	9.1	11.0	11.1	0.9	2.3	-----	-----	-----	-----	5.7	19.3	7.4	66.8
1877	3.1	2.2	8.7	3.8	0.1	-----	-----	-----	-----	1.0	1.6	0.4	20.9
1878	2.0	1.2	0.8	1.8	5.5	-----	-----	-----	-----	7.5	1.7	7.1	27.6
1879	7.1	3.4	5.8	1.6	0.8	-----	-----	-----	-----	1.4	2.6	18.5	41.2
1880	5.7	8.4	4.7	7.9	T	-----	-----	-----	-----	0.3	1.2	6.4	34.6
1881	0.9	28.3	4.9	2.5	T	-----	-----	-----	-----	4.9	17.9	4.4	63.8
1882	8.9	9.0	14.1	2.9	1.7	-----	-----	-----	-----	2.7	10.8	11.3	61.4
1883	4.9	5.4	3.9	3.2	0.3	-----	-----	-----	-----	1.2	7.8	7.4	34.1
1884	4.4	8.9	8.5	5.6	0.0	-----	-----	-----	-----	5.4	4.6	7.8	45.2
1885	2.4	2.8	6.1	5.0	2.2	-----	-----	-----	-----	2.5	3.9	6.6	31.5
1886	7.0	6.7	3.3	2.5	0.4	-----	-----	-----	-----	0.8	4.6	2.9	28.2
1887	8.8	6.5	6.5	5.1	1.2	-----	-----	-----	-----	1.0	5.8	10.6	45.5
Means	5.6	8.1	6.6	5.9	0.9	-----	-----	-----	-----	3.7	7.8	7.4	46.4

APPENDIX No. 13.

Average snowfall in inches. Computed from the records at all stations.

[Annual report Meteorological Service, Dominion of Canada.]

BRITISH COLUMBIA.

[T indicates a trace of precipitation.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1873	9.0	T	3.0	0.0	0.0	.....	.....	.....	.....	0.0	T	6.0	18.0
1874	13.5	7.5	7.0	0.0	0.0	.....	.....	.....	.....	0.0	13.0	2.0	43.0
1875	7.2	0.0	4.8	T	.....	.....	.....	.....	.....	.....	5.5	1.8	19.3
1876	2.0	2.0	3.2	.....	.....	.....	.....	.....	.....	.....	1.2	1.1	9.5
1877	3.0	1.5	0.9	0.0	0.0	.....	.....	.....	.....	0.0	0.0	0.0	5.4
1878	1.0	2.3	0.2	4.7	0.0	.....	.....	.....	.....	0.0	0.7	2.9	11.8
1879	18.8	20.2	4.7	0.1	0.0	.....	.....	.....	.....	0.1	2.2	14.7	60.8
1880	31.3	14.7	10.7	2.4	0.0	.....	.....	.....	.....	0.0	1.7	12.4	73.2
1881	16.6	6.2	0.5	0.4	T	.....	.....	.....	.....	1.4	3.6	3.6	32.3
1882	8.4	13.7	3.1	0.0	0.1	.....	.....	.....	.....	T	2.4	3.6	31.3
1883	10.1	6.5	1.1	T	.....	.....	.....	.....	.....	.....	7.3	4.0	29.0
1884	5.9	3.7	0.2	0.0	0.0	.....	.....	.....	.....	0.2	1.1	6.7	17.8
1885	10.7	3.9	0.7	0.4	T	.....	.....	.....	.....	T	0.7	2.3	18.7
1886	15.6	1.2	2.6	0.0	1.3	.....	.....	.....	.....	0.6	0.3	13.1	34.7
1887	10.2	14.5	3.8	0.5	0.1	.....	.....	.....	.....	0.5	0.9	3.0	33.5
Means	10.9	6.5	3.1	0.6	0.1	.....	.....	.....	.....	0.2	2.7	5.1	29.2

APPENDIX No. 14.

Mean annual precipitation with annual and mean annual deviations in inches.

[NOTE.—The mean annual deviation is obtained by dividing half the sum of the excesses and deficiencies, neglecting the algebraic signs, by the mean annual precipitation.]

Stations.	Mean annual.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.
NORTH DAKOTA.										
Abercrombie, Fort.....	17.83					+5.51	— 6.45	— 4.43	—0.98	—0.31
Abraham Lincoln, Fort.....	16.03									
Bismarck.....	18.90									
Buford, Fort.....	13.29									
Pembina, Fort.....	20.30									
Rice, Fort.....	15.17									
Stevenson, Fort.....	15.77									
Totten, Fort.....	17.78									
Yates, Fort.....	16.21									
SOUTH DAKOTA.										
Bennett, Fort.....	17.25									
Deadwood.....	28.48									
Hale, Fort.....	19.41									
Huron.....	22.10									
Kimball.....	16.77									
Meade, Fort.....	18.59									
Morrison.....	27.72									
Randall, Fort.....	20.47	—4.31	+0.83	—4.77	—1.28	—0.24	— 4.96	—13.23		
Rapid City.....	18.46									
Sisseton, Fort.....	21.92									
Sully, Fort.....	16.96									
Webster.....	38.68									
Yankton.....	26.62									
MINNESOTA.										
Moorhead.....	24.37									
St. Vincent.....	19.11									
NEBRASKA.										
Hay Springs.....	20.13									
Robinson, Fort.....	16.29									
Valentine.....	20.52									
Annual sums.....	20.19	—4.31	+0.83	—4.77	—1.28	+5.27	—11.41	—17.66	—0.98	—0.31
Annual sums North Dakota...	16.81					+5.51	— 6.45	— 4.43	—0.98	—0.31
Annual sums South Dakota...	22.57	—4.31	+0.83	—4.77	—1.28	—0.24	— 4.96	—13.23		

Mean annual precipitation with annual and mean annual deviations in inches—Continued.

Stations.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.
NORTH DAKOTA.										
Abercrombie, Fort.....	-5.29	+1.83	+ 1.64	+ 4.90	+ 3.54	- 2.63	+ 9.99	.....	.....	.....
Abraham Lincoln, Fort.....									-10.47	- 5.68
Bismarck.....										+ 8.62
Buford, Fort.....			- 1.79	- 3.88	- 3.39	- 5.10	+ 3.51	.....	- 5.71	+ 1.56
Pembina, Fort.....							- 3.11	- 6.25	- 8.42	- 6.77
Rice, Fort.....						- 5.33	- 1.07	- 2.62	- 3.43	- 0.16
Stevenson, Fort.....			- 4.64	.....	.....	+ 1.22	- 0.78	- 5.97	- 7.96	- 0.79
Totten, Fort.....					- 2.58	- 0.75	+ 1.22	- 0.48	- 1.07	+ 4.39
Yates, Fort.....										
SOUTH DAKOTA.										
Bennett, Fort.....										
Deadwood.....										
Hale, Fort.....										
Huron.....										
Kimball.....										
Meade, Fort.....										
Morrison.....										
Randall, Fort.....		-4.62	- 5.84	- 3.55	-13.35	- 5.00	- 2.05	- 2.17	- 2.57	+ 8.25
Rapid City.....										
Sisseton, Fort.....				- 7.83	- 4.06	-11.12	+ 1.44	+ 5.20	+10.52	+ 9.48
Sully, Fort.....				- 0.81	+ 0.52	+ 6.78	+ 2.46	- 2.34	- 0.72	- 2.97
Webster.....										
Yankton.....									- 2.69	+10.53
MINNESOTA.										
Moorhead.....										
St. Vincent.....										
NEBRASKA.										
Hay Springs.....										
Robinson, Fort.....										
Valentine.....										
Annual sums.....	-5.29	-2.79	-10.63	-11.17	-19.32	-21.93	+11.61	-14.63	-32.52	+26.46
Annual sums North Dakota...	-5.29	+1.83	- 4.79	+ 1.02	- 2.43	-12.59	+ 9.76	-15.32	-37.06	+ 0.97
Annual sums South Dakota...		-4.62	- 5.84	-12.19	-16.89	- 9.34	+ 1.85	+ 0.69	+ 4.54	+25.29

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Mean annual precipitation with annual and mean annual deviations in inches—Continued.

Stations.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
NORTH DAKOTA.									
Abercrombie, Fort.....	— 9.24								
Abraham Lincoln, Fort.....	— 0.95	+10.75	— 6.92		— 2.84	— 2.31	+7.63	+ 3.81	+ 9.29
Bismarck.....	+12.02	— 1.22	+ 1.33	+ 3.71	+ 0.85	— 3.14	+2.43	— 3.24	+ 4.46
Buford, Fort.....	— 0.95	— 1.00		+ 6.38	+ 9.96	+ 0.61	— 0.56	— 2.47	— 5.92
Pembina.....	+ 5.45	+ 1.37	+13.53	— 0.99	+ 7.05	— 1.04			
Rice, Fort.....			+15.71						
Stevenson, Fort.....	+ 6.09			+ 5.23	— 3.54	+ 4.06	+9.97		
Totten, Fort.....	— 3.38	+ 1.06	+ 4.67	+ 1.37	+ 4.46	+ 0.37	+0.80	+ 0.15	— 0.42
Yates, Fort.....							—3.66	— 2.08	— 0.27
SOUTH DAKOTA.									
Bennett, Fort.....						+ 2.55	+0.55	— 0.34	— 0.35
Deadwood.....				+ 0.02	— 9.28	— 7.35	+5.35	+ 1.21	— 4.19
Hale, Fort.....				— 4.75	— 0.75	+ 6.15	— 1.33	+ 2.57	
Huron.....							+6.02	+ 1.15	— 1.26
Kimball.....									
Meade, Fort.....						— 3.53	+0.73	+ 8.46	+ 4.38
Morrison.....		— 1.87	+ 0.11	— 4.92		+11.03	— 2.22		
Randall, Fort.....	+13.42	+20.73	+18.83	+ 0.36	+ 6.95	+ 4.48	+5.43	+ 9.64	— 0.76
Rapid City.....							— 0.19		
Sisseton, Fort.....							+1.29		— 1.64
Sully, Fort.....	+ 2.58	+ 5.95	+ 3.23	+ 6.54	— 0.30	— 2.11	— 4.76	+ 2.95	— 4.99
Webster.....								+ 6.14	+26.50
Yankton.....	+ 2.22	+ 1.69	+ 2.11	— 3.89	— 4.94	+14.33	— 5.99	+ 8.52	— 4.46
MINNESOTA.									
Moorhead.....						+ 5.11	+9.64	+ 0.59	+ 4.13
St. Vincent.....						— 3.60	+3.37	— 1.23	+ 2.70
NEBRASKA.									
Hay Springs.....									
Robinson, Fort.....									— 2.33
Valentine.....									
Annual sums.....	+27.26	+37.44	+52.60	+ 9.06	+ 7.62	+25.31	+34.50	+23.55	+24.87
Annual sums North Dakota.....	+ 9.04	+10.96	+28.32	+15.70	+15.94	— 1.45	+16.61	— 3.83	+ 7.14
Annual sums South Dakota.....	+18.22	+26.50	+24.28	— 6.64	— 8.32	+25.55	+ 4.48	+28.02	+13.23

Mean annual precipitation with annual and mean annual deviations in inches—Continued.

Stations.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	Abso- lute de- viation.	Mean devia- tion.
NORTH DAKOTA.									<i>Per cent.</i>
Abercrombie, Fort								+ 0.38	24
Abraham Lincoln, Fort	+2.37	- 2.09	+ 1.26		- 5.77	+ 2.08		+ 0.68	31
Bismarek	-5.82	- 5.64	- 2.57	- 2.39	- 7.87	- 3.15	+ 1.60	+ 0.49	22
Buford, Fort	+2.27	- 3.05	+ 2.14	+ 1.45	- 4.83	+ 0.95	+ 5.69	+ 0.23	25
Pembina, Fort	-2.93	+ 8.94	+ 3.06	- 2.31	- 8.55		+ 5.63	+ 1.95	27
Rice, Fort								+ 3.10	
Stevenson, Fort								+ 1.36	29
Totten, Fort	+0.91	- 3.56	+ 1.57	- 1.65	- 7.24			- 0.44	12
Yates, Fort	+0.54	+ 7.76	- 1.99	+ 0.03	- 2.53	- 0.61	+2.77	+ 0.92	14
SOUTH DAKOTA.									
Bennett, Fort						- 3.66		- 1.25	22
Deadwood	± 0	- 2.41	+ 3.18					- 2.70	12
Hale, Fort								+ 2.08	17
Huron	+3.68	- 1.85	+ 3.44	- 5.05	- 1.93	- 7.42	- 1.93	+ 0.33	15
Kimball			+ 7.88	- 4.25	+ 0.97	- 2.69	+ 7.47	+ 1.97	26
Meade, Fort	-5.34	- 5.08	+ 0.34	+ 1.41	- 0.59	- 2.36	+ 3.20	- 0.29	17
Morrison								+ 2.57	15
Randall, Fort	+4.09	+ 1.03	- 3.74	- 1.10	- 1.45	- 6.43	+ 2.48	+ 3.14	28
Rapid City				+ 4.29	- 0.53	- 4.44	- 1.71	+ 2.57	16
Sisseton, Fort	-1.93	- 7.81	+ 6.94					+ 0.08	26
Sully, Fort	+3.76	- 0.96	- 2.70	- 2.19	- 1.67	- 3.68	- 3.78	+ 1.43	18
Webster	+0.13	+ 3.22	- 6.48	-17.51	- 0.66	- 4.72		+ 2.85	44
Yankton	+3.56	+ 2.53	+ 0.46	- 5.73	- 6.91	- 5.37	- 2.19	+ 1.06	20
MINNESOTA.									
Moorhead	-1.69	+ 2.39	- 2.40	- 7.87	- 7.30	- 2.58	- 0.06	+ 0.72	16
St. Vincent	-2.53	- 4.07	- 0.64	- 1.89	- 4.67	+ 2.98	+ 9.24	+ 1.89	19
NEBRASKA.									
Hay Springs		- 1.91	+ 2.77	+ 1.13	- 0.97	- 4.18	+ 3.13	- 0.01	11
Robinson, Fort	+2.74	- 5.21	+ 8.96	+ 1.25	- 2.39	- 4.53	+ 2.45	+ 0.23	23
Valentine		- 6.54	- 2.52	+ 2.82	- 0.83	- 0.73	+ 7.25	+ 2.38	19
Annual sums	+3.81	-24.31	+18.96	-39.56	-65.72	-50.51	+41.24	+27.72	21
Annual sums North Dakota	-2.66	+ 2.36	+ 3.47	- 4.87	-36.79	- 0.73	+15.69	+ 8.67	23
Annual sums South Dakota	+7.95	-11.33	+ 9.32	-30.13	-12.77	-40.77	+ 3.54	+13.84	21

APPENDIX No. 15.

Excessive precipitation.

NORTH DAKOTA.

Stations.	Rainfall of 10 inches or more per month.		Rainfall of 2.50 inches or more in 24 hours.			Rainfall equaling or exceeding 1 inch per hour.			
	Year.	Amount.	Year.	Day.	Amount.	Year.	Day.	Time.	Amount.
<i>May.</i>		<i>Inches.</i>			<i>Inches.</i>			<i>Hrs. min.</i>	<i>Inches.</i>
Fort Pembina.....			1880	26	2.64				
<i>June.</i>									
Fort Abercrombie.....	1872	10.15	1872	30	3.50				
			1874	23	3.14				
Bismarck.....			1888	8, 9	2.54				
Buford.....			1885	6	3.23	1874	6	1 00	1.40
Fort Pembina.....			1877	22	3.24				
Fort Ransom.....			1872	25, 26	2.65				
Fort Totten.....			1871	4	4.02				
			1875	1	2.80				
			1887	15, 16	2.55				
			1888	8, 9	2.64				
Bismarck.....						1890	1	0 35	1.00
Fort Abraham Lincoln.....	1890	10.93							
Fort Buford.....			1890	19, 20	3.50				
Fort Pembina.....			1890	29, 30	2.74				
Churchs Ferry.....			1891	12	2.64				
Grafton.....			1891	12, 13	2.50				
			1891	27	3.10				
Steele.....			1891	14	4.25	1891	14	1 20	4.00
<i>July.</i>									
Fort Pembina.....			1876	18, 19	3.41				
Fort Ransom.....			1872	24	3.45	1872	7	0 55	2.05
Fort Sisseton.....						1879	21	1 10	1.92
Fort Totten.....			1877	26	2.68				
Fort Yates.....			1888	1	2.70				
Steele.....						1889	16	0 33	1.25
Fort Pembina.....						1890	10	0 55	1.04
Wahpeton.....			1890	14	3.00				
Davenport.....			1891	20, 21	3.10				
Grand Rapids.....			1891	12	2.70	1891	12	2 30	2.60
Napoleon.....			1891	11, 12	3.02				
Wild Rice.....			1891	12	2.50	1891	12	1 45	2.50
			1891	20, 21	2.90	1891	21	1 50	2.51
<i>August.</i>									
Fort Abraham Lincoln.....			1876	22, 23	3.36				
Fort Buford.....						1887	7	1 00	1.04
Fort Stevenson.....			1876	22	3.00				
Fort Totten.....			1874	27, 28	2.82	1874	4	0 35	1.04
			1880	25, 26	5.10				
Fargo.....						1891	19	0 53	1.07
Fort Pembina.....						1891	7	0 45	1.30
<i>September.</i>									
Fort Abercrombie.....			1869	1	3.46				
			1877	7, 8	3.10				
Davenport.....			1889	13	2.55				
<i>October.</i>									
Pembina.....			1878	1	2.56				
Fort Pembina.....			1890	13, 14	2.88				
Valley City.....			1891	1	2.80				

APPENDIX No. 16.

Excessive precipitation.

SOUTH DAKOTA.

Stations.	Rainfall of 10 inches or more per month.		Rainfall of 2.50 inches or more in 24 hours.			Rainfall equaling or exceeding 1 inch per hour.			
	Year.	Amount.	Year.	Day.	Amount.	Year.	Day.	Time.	Amount.
<i>April.</i>		<i>Inches.</i>			<i>Inches.</i>			<i>Hrs. min.</i>	<i>Inches.</i>
Deadwood			1877	16	2.52				
			1878	17	3.20				
			1879	21, 22	2.86				
			1886	22, 23	3.32				
Fort Sully			1886	24, 25	2.74				
Yankton			1875	6, 7	4.60				
Huron						1889	11	1 00	1.40
<i>May.</i>									
Deadwood	1883	10.33	1874	2	4.55				
			1882	7, 8	3.33				
			1883	17, 18	2.77				
			1883	18, 19	2.62				
Morristown			1881	16, 17	3.40				
Fort Randall			1872	15	6.13				
Rapid City	1883	10.02							
Fort Sully			1874	1, 2	4.55				
Webster						1885	20	1 05	1.34
						1886	8	0 45	1.84
Yankton			1888	27	2.52				
Wolsey						1889	16	1 00	1.25
Clark						1891	30	2 00	2.37
Fort Meade			1891		3.24				
<i>June.</i>									
Deadwood			1874	9, 10	2.51				
			1883	23, 24	3.34				
Fort Randall	1875	12.82	1875	30	5.10	1873	28	0 15	1.56
			1875	18	4.85	1875	14	0 45	1.10
			1885	1	2.80	1878	23	1 30	2.20
						1888	7	0 12	0.27
Rapid City			1869	28, 29	3.50				
Fort Sully			1886	13	3.19				
Webster						1884	24	0 20	1.33
						1885	3	2 00	2.22
						1886	14	3 15	3.65
Yankton			1875	18	3.10	1875	18	1 15	1.73
			1875	30	5.20				
Armour						1889	19	0 50	1.00
Onida						1889	17	0 30	1.00
Spring Lake			1889	25	3.00	1889	25	1 15	3.00
Webster			1889	17	3.90	1889	17	2 45	3.90
Aberdeen			1890	16, 17	3.35				
Fort Meade			1890	4, 5	3.80				
Fort Sully			1890	3, 4	3.78				
Highmore			1890	17	2.50	1890	17	1 30	2.50
						1890	20	0 40	1.20
Milbank	1890	10.53	1890	3, 4	4.40				
Cross			1891	1, 2	2.65				
Huron						1891	13	1 15	1.36
Kimball			1891	15, 16, 17	6.01				
Plankinton			1891	26, 27	2.75				
Spearfish			1891	14	3.00	1891	14	2 40	3.00
St. Lawrence			1891	15, 16	3.75				

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Excessive precipitation—Continued.

SOUTH DAKOTA—Continued.

Stations.	Rainfall of 10 inches or more per month.		Rainfall of 2.50 inches or more in 24 hours.			Rainfall equaling or exceeding 1 inch per hour.			
	Year.	Amount.	Year.	Day.	Amount.	Year.	Day.	Time.	Amount.
<i>July.</i>		<i>Inches.</i>			<i>Inches.</i>			<i>Hrs. min.</i>	<i>Inches.</i>
Deadwood			1876	8	3.80	1872	27	0 45	1.16
Firesteel			1888	28	2.70				
Highmore						1882	29	2 00	2.06
Huron						1884	21	0 45	1.05
						1885	26	0 10	1.30
						1888	1	1 00	1.40
Fort Meade	1878	10.20	1878	22, 23	8.00				
Morrison						1887	1	0 50	1.45
Parkston	1878	11.85	1869	14, 15	3.10				
Fort Randall			1871	31	6.45				
Fort Sully			1878	21, 22	3.10				
	1884	14.65	1884	2, 3	4.84	1884	2, 3	1 45	4.84
Webster			1887	2, 3	2.74	1884	4	1 05	1.10
						1885	19	0 55	2.21
Yankton			1879	15	3.11	1888	13	0 50	1.20
Armour						1889	11	1 05	2.15
Beulah			1889	11	2.56	1889	11	1 20	2.56
De Smet						1889	7	2 00	2.20
Fort Meade						1889	11	0 35	1.40
Spearfish						1889	24	0 45	1.10
Spring Lake			1889	7, 8	3.00				
Webster			1889	11	2.89				
Wolsey						1889	25	1 00	1.59
Scranton						1890	21	0 40	1.06
Yankton			1890	19, 20	2.70				
Flandreau						1891	16	0 35	1.40
Forest City			1891	5, 6	2.72	1891	3	0 40	2.25
Gary						1891	16	0 30	1.30
Parkston						1891	19	1 00	1.58
Rapid City						1891	5	0 43	1.33
<i>August.</i>									
Deadwood						1875	8	1 05	1.70
Fort Randall			1871	12, 13	2.84	1875	25	1 00	2.30
			1885	7	2.68	1888	5	0 30	1.32
Fort Sully			1869	13	4.32				
Huron			1886	19, 20	2.49	1886	7	1 00	1.90
						1886	19	1 00	1.62
Morrison			1881	1	3.20	1881	30	1 30	1.60
Parkston	1887	10.84	1877	29	3.60	1887	2	1 00	1.50
Webster			1884	19	3.54				
Yankton			1886	8, 9	3.46				
Alexandria			1889	18	2.75				
Yankton						1889	12	1 02	1.46
Rapid City						1890	10	1 06	1.17
Fort Bennett						1891	14	0 30	1.00
Sioux Falls						1891	19	1 00	1.22
Tyndall						1891	10	0 30	1.43
<i>September.</i>									
Fort Randall			1876	8, 9	3.40				
Smithville			1881	6	4.08				
Webster			1885	12	3.81				
Yankton			1875	2	3.00	1875	2	1 30	1.50
			1879	29	2.59				
			1885	11, 12	2.53				
			1881	6	3.45				
Alexandria			1889	13	3.00				
Canton			1889	13, 14	4.22				
Webster			1889	13, 14	3.49				
Sioux Falls			1890	5, 6	2.80				
<i>October.</i>									
Deadwood			1879	15, 16	3.47				

APPENDIX No. 17.

Seasonal precipitation normals—Quarterly values—Records for many years.

Stations.	First quarter.			Second quarter.			Third quarter.			Fourth quarter.			Annual.
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
NORTH DAKOTA.													
	Inches.			Inches.			Inches.			Inches.			Inches.
Abercrombie, Fort	2.05			6.94			6.47			2.37			17.83
Abraham Lincoln, Fort.....	1.70			7.63			4.69			1.98			16.00
Bismarck	2.19			8.47			5.82			2.42			18.90
Buford, Fort	1.53			6.00			3.83			1.93			13.29
Davenport	1.20			5.72			8.41			1.59			16.92
New England City	1.18			7.40			2.85			1.06			12.49
Pembina, Fort	2.34			8.15			6.44			3.23			20.16
Ransom, Fort	2.77			6.90			7.39			2.02			19.08
Rice, Fort	1.89			7.84			3.69			1.76			15.18
Richardton	4.53			10.43			8.30			3.22			26.48
Seward, Fort	1.02			7.79			5.45			0.83			15.09
Stevenson, Fort	1.89			6.35			5.59			1.94			15.77
Totten, Fort	1.95			7.41			5.85			2.61			17.82
Yates, Fort	2.16			6.84			5.61			1.62			16.23
Means	2.03			7.42			5.74			2.08			17.23
SOUTH DAKOTA.													
Alexandria	2.87			10.20			8.76			3.25			25.08
Bennett, Fort	1.98			7.90			5.65			1.72			17.25
Brookings	2.14			7.73			4.91			1.80			16.58
Deadwood	4.45			13.55			6.13			4.35			28.48
Hale, Fort	2.62			8.62			5.61			3.06			19.91
Huron	1.73			9.79			8.06			2.51			22.09
Kimball	2.22			7.16			5.39			2.00			16.77
Meade, Fort	2.42			9.61			4.92			1.62			18.57
Morrison	2.61			11.44			9.84			3.83			27.72
Olivet	2.41			11.94			8.09			3.90			26.34
Parkston	2.82			8.53			11.51			2.24			25.10
Randall, Fort	2.08			8.59			7.19			2.59			20.45
Rapid City	2.44			10.24			4.46			1.30			18.44
Sisseton, Fort	2.73			8.71			7.40			3.07			21.91
Sully, Fort	1.93			7.77			5.81			1.49			17.00
Vermillion	2.42			6.20			6.78			2.96			18.36
Webster	7.01			14.48			10.08			6.27			37.84
Wolsey	2.53			7.86			3.99			2.16			16.54
Woonsocket	1.74			7.09			4.05			1.26			14.14
Yankton	2.54			11.62			9.59			2.91			26.66
Means	2.68			9.45			6.91			2.71			21.75
IOWA, MINNESOTA, AND NEBRASKA.													
Sioux City, Iowa	2.95			10.44			11.61			4.26			29.26
Moorhead, Minn.	2.44			8.57			9.52			3.83			24.36
St. Vincent, Minn.	1.93			6.82			7.14			3.22			19.11
Hay Springs, Nebr.	2.99			9.07			5.93			2.13			20.12
Robinson, Fort, Nebr.	2.41			6.59			4.75			2.78			16.53
Valentine, Nebr.	2.64			9.11			6.89			1.84			20.48

APPENDIX No. 18.

Seasonal precipitation normals—Records for many years.

Stations.	Dry season—Winter.				Wet season—Spring, summer, and autumn.								Annual.
	Jan.	Feb.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	
NORTH DAKOTA.													
	Inches.				Inches.								
Abercrombie, Fort		2.43							15.40				17.83
Abraham Lincoln, Fort.....		2.10							13.90				16.00
Bismarck		2.53							16.37				18.90
Buford, Fort		2.04							11.25				13.29
Davenport		1.48							15.44				16.92
New England City		1.31							11.18				12.49
Pembina, Fort		3.01							17.15				20.16
Ransom, Fort		3.04							16.04				19.08
Rice, Fort		2.18							13.00				15.18
Richardton		5.77							20.71				26.48
Seward, Fort		0.64							14.45				15.09
Stevenson, Fort		1.79							13.98				15.77
Totten, Fort		2.43							15.39				17.82
Yates, Fort.....		2.58							13.65				16.23
Means		2.38							14.85				17.23
SOUTH DAKOTA.													
Alexandria.....		2.84							22.24				25.08
Bennett, Fort.....		2.23							15.02				17.25
Brookings		3.00							13.58				16.58
Deadwood		5.23							23.25				28.48
Hale, Fort		2.39							17.52				19.91
Huron		2.20							19.89				22.09
Kimball		3.01							13.76				16.77
Meade, Fort.....		2.30							16.27				18.57
Morrison		2.77							24.95				27.72
Olivet		3.09							23.25				26.34
Parkston		3.48							21.62				25.10
Randall, Fort		2.33							18.12				20.45
Rapid City.....		2.07							16.37				18.44
Sisseton, Fort.....		2.89							19.02				21.91
Sully, Fort.....		1.79							15.21				17.00
Vermillion		2.97							15.39				18.36
Webster		8.34							29.50				37.84
Wolsey		3.31							13.23				16.54
Woonsocket		2.12							12.02				14.14
Yankton		2.87							23.79				26.66
Means		3.06							18.70				21.75
IOWA, MINNESOTA, AND NEBRASKA.													
Sioux City, Iowa		3.80							25.46				29.26
Moorhead, Minn.....		3.28							21.08				24.36
St. Vincent, Minn.....		2.62							16.49				19.11
Hay Springs, Nebr		3.12							17.00				20.12
Robinson, Fort, Nebr.....		2.45							14.08				16.53
Valentine, Nebr		2.15							18.33				20.48

APPENDIX No. 19.

Seasonal precipitation normals—Records for many years.

Stations.	Dry season—Winter, spring, and autumn.							Wet season—Summer.					Annual.
	Jan.	Feb.	Mar.	Sept.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	
NORTH DAKOTA.													
	Inches.							Inches.					
Abercrombie, Fort				6.24						11.59			17.83
Abraham Lincoln, Fort.....				4.45						11.58			16.00
Bismarck				5.70						13.20			18.90
Buford, Fort				4.37						8.92			13.29
Davenport				5.57						11.35			16.92
New England City				2.58						9.91			12.49
Pembina, Fort				7.19						13.11			20.16
Ransom, Fort				6.95						12.13			19.08
Rice, Fort				4.48						10.69			15.18
Richardton				9.05						17.43			26.48
Seward, Fort				2.97						12.12			15.09
Stevenson, Fort				5.21						10.56			15.77
Totten, Fort				5.55						12.23			17.82
Yates, Fort				4.58						11.63			16.23
Means				5.35						11.89			17.23
SOUTH DAKOTA.													
Alexandria				8.36						16.72			25.08
Bennett, Fort				5.03						12.22			17.25
Brookings				4.99						11.59			16.58
Deadwood				9.86						18.62			28.48
Hale, Fort				6.38						13.03			19.91
Huron				5.71						16.39			22.09
Kimball				5.12						11.65			16.77
Meade, Fort.....				4.60						13.99			18.57
Morrison				8.57						19.15			27.72
Morrison				8.45						17.89			26.34
Olivet				7.57						17.53			25.10
Parkston.....				6.58						13.89			20.45
Randall, Fort				4.48						13.98			18.44
Rapid City				7.08						14.84			21.91
Sisseton, Fort.....				4.37						12.59			17.00
Sully, Fort.....				7.07						11.29			18.36
Vermillion				16.11						22.57			37.84
Webster				6.05						10.49			16.54
Wolsey				4.11						10.03			14.14
Woonsocket				8.19						18.47			26.66
Yankton				6.93						14.84			21.75
IOWA, MINNESOTA, AND NEBRASKA.													
Sioux City, Iowa.....				10.55						18.71			29.26
Moorhead, Minn.....				8.79						15.57			24.36
St. Vincent, Minn.....				7.28						11.83			19.11
Hay Springs, Nebr				5.74						14.39			20.12
Robinson, Fort, Nebr.....				5.72						10.57			16.53
Valentine, Nebr				5.65						14.87			20.48

APPENDIX No. 20.

Seasonal precipitation normals—Records for many years.

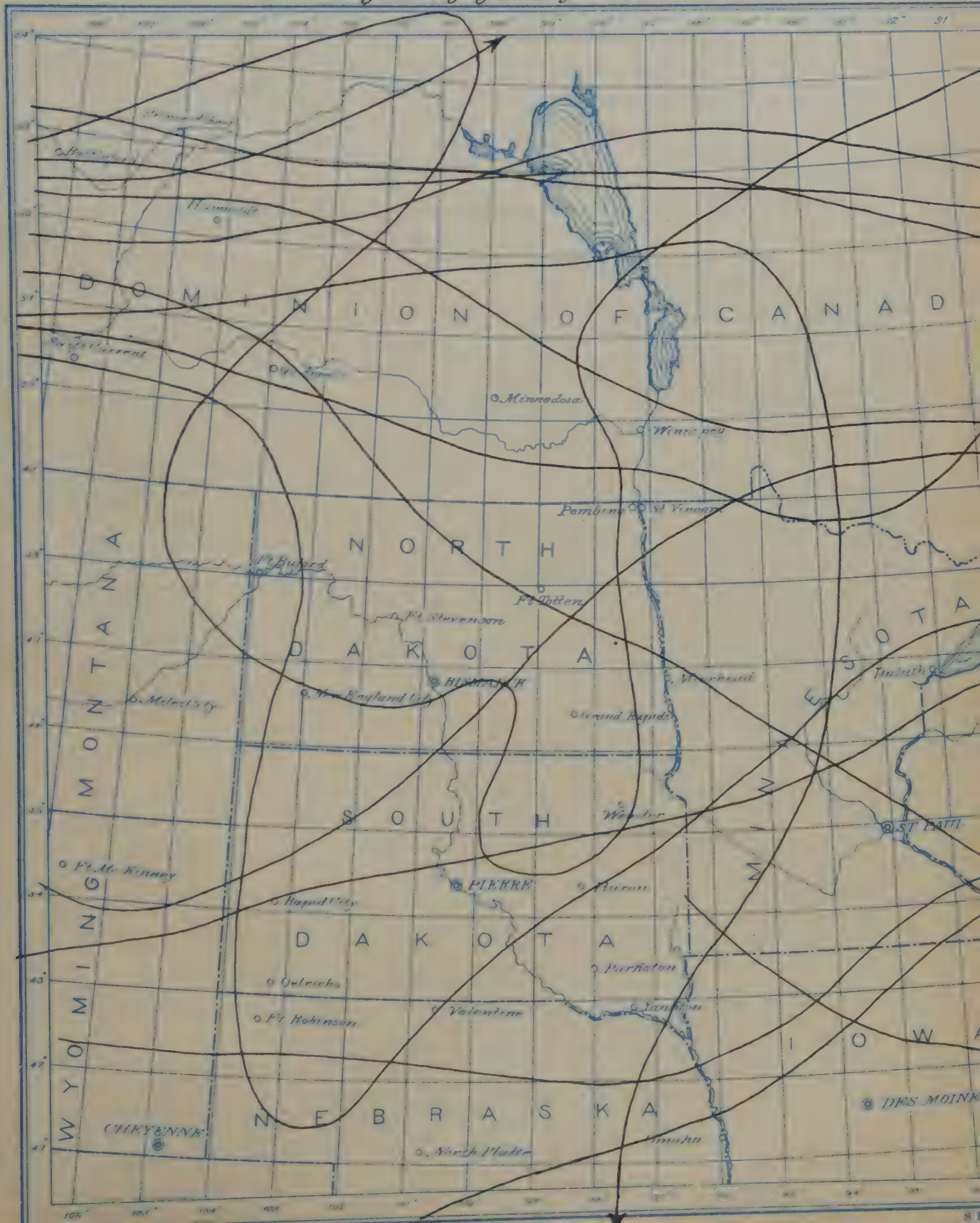
Stations.	Dry season—October to March, inclusive.						Wet season—April to September, inclusive.						Annual.
	Jan.	Feb.	Mar.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.	
NORTH DAKOTA.													
	Inches.						Inches.						
Abercrombie, Fort				4.42						13.41			17.83
Abraham Lincoln, Fort.....				3.68						12.32			16.00
Bismarck				4.61						14.29			18.90
Buford, Fort				3.46						9.83			13.29
Davenport				2.79						14.13			16.92
New England City				2.24						10.25			12.49
Pembina, Fort				5.57						14.59			20.16
Ransom, Fort				4.79						14.34			19.08
Rice, Fort				3.65						11.53			15.18
Richardton				7.75						18.73			26.48
Seward, Fort				1.85						13.24			15.09
Stevenson, Fort				3.83						11.94			15.77
Totten, Fort				4.56						13.26			17.82
Yates, Fort.....				3.78						12.45			16.23
Means				4.07						13.16			17.23
SOUTH DAKOTA.													
Alexandria.....				6.12						18.96			25.08
Bennett, Fort				3.70						13.55			17.25
Brookings				3.94						12.64			16.58
Deadwood				8.80						19.68			28.48
Hale, Fort				5.68						14.23			19.91
Huron				4.24						17.85			22.09
Kimball				4.22						12.55			16.77
Meade, Fort.....				4.04						14.53			18.57
Morrison				6.44						21.28			27.72
Olivet				6.31						20.03			26.34
Parkston.....				5.06						20.04			25.10
Randall, Fort				4.67						15.78			20.45
Rapid City				3.74						14.70			18.44
Sisseton, Fort.....				5.80						16.11			21.91
Sully, Fort.....				3.42						13.58			17.00
Vermillion				5.38						12.98			18.36
Webster				13.28						24.56			37.84
Wolsey				4.69						11.85			16.54
Woonsocket				3.00						11.14			14.14
Yankton				5.45						21.21			26.66
Means				5.40						16.36			21.75
IOWA, MINNESOTA, AND NEBRASKA.													
Sioux City, Iowa.....				7.21						22.05			29.26
Moorhead, Minn.....				6.27						18.09			24.36
St. Vincent, Minn.....				5.15						13.96			19.11
Hay Springs, Nebr.....				5.12						15.00			20.12
Robinson, Fort, Nebr.....				5.19						11.34			16.53
Valentine, Nebr.....				4.48						16.00			20.48

Dry Periods. Appendix N^o 2

Tracks of Areas of Low Pressure. (Storm Centers.)

May, June, and August 1889.

Total Deficiency of Rainfall 72.93 Inches.



APPENDIX No. 21

Deficiency of precipitation as compared with normal values for many years.

DRY PERIODS.

[In inches.]

Stations.	May, 1889.	June, 1889.	August, 1889.	Total de- ficiency.
Bismarck, N. Dak.....	+0.72	2.56	1.66	3.50
Fort Buford, N. Dak.....	+0.45	1.75	0.35	1.65
Fort Pembina, N. Dak.....	2.42	2.64	+0.24	4.82
Fort Totten, N. Dak.....	1.70	2.13	+0.20	3.63
Fort Yates, N. Dak.....	+1.68	1.94	1.35	1.61
Davenport, N. Dak.....	+0.22	2.62	+0.33	2.07
Fort Bennett, S. Dak.....	+1.12	1.89	1.16	1.93
Huron, S. Dak.....	0.10	3.04	2.31	5.45
Fort Meade, S. Dak.....	2.00	1.62	1.96	5.58
Fort Randall, S. Dak.....	1.44	1.90	1.95	4.39
Rapid City, S. Dak.....	2.11	0.94	1.48	4.53
Fort Sully, S. Dak.....	+0.36	1.61	1.04	2.29
Webster, S. Dak.....	0.51	+0.66	1.98	1.83
Yankton, S. Dak.....	2.47	1.60	0.41	4.48
Alexandria, S. Dak.....	1.29	2.61	+1.11	2.79
Brookings, S. Dak.....	0.39	3.01	1.12	4.52
Kimball, S. Dak.....	0.02	2.52	0.43	2.97
Spearfish, S. Dak.....	0.46	3.73	1.30	5.49
Moorhead, Minn.....	0.76	3.17	1.37	5.30
St. Vincent, Minn.....	1.06	2.88	0.16	4.10
Sums.....	12.18	43.50	17.25	72.93

APPENDIX No. 23.

Deficiency of precipitation as compared with normal values for many years.

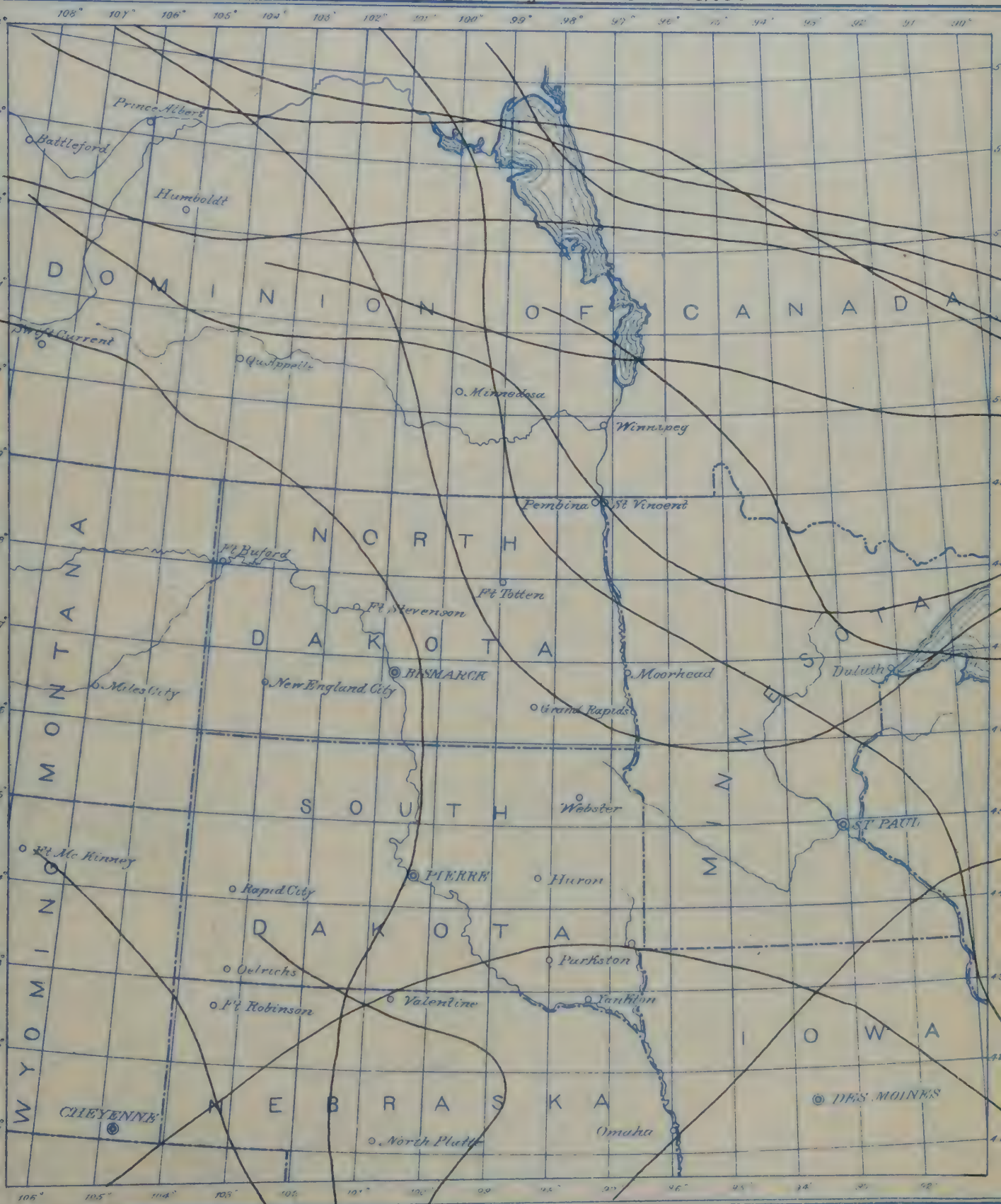
DRY PERIODS.

[In inches.]

Stations.	May, 1886.	June, 1886.	July, 1886.	Total de- ficiency.
Bismarck, N. Dak.....	0.90	1.56	1.11	3.57
Fort Buford, N. Dak.....	0.80	1.85	1.06	3.71
Fort Pembina, N. Dak.....		0.46	+0.66	0.77
Fort Totten, N. Dak.....		0.90	1.08	1.55
Richardson, N. Dak.....	(*)	1.82	0.87	2.69
Deadwood, S. Dak.....	3.64	1.73	0.39	5.76
Huron, S. Dak.....	1.56	2.18	2.03	5.77
Fort Meade, S. Dak.....	3.45	2.32	+0.98	4.79
Fort Randall, S. Dak.....	0.79	1.31	2.46	4.56
Fort Sully, S. Dak.....	1.74	0.01	0.37	2.12
Fort Sisseton, S. Dak.....	1.32	2.05	2.18	5.55
Yankton, S. Dak.....	0.80	1.21	3.07	5.08
Kimball, S. Dak.....	0.88	0.69	1.25	2.82
St. Vincent, Minn.....	0.34	1.49	0.38	2.21
Sums.....	16.76	19.58	14.61	50.95

*Missing.

Dry Periods. Appendix N^o 24.
Tracks of Areas of Low Pressure. (Storm Centers.)
May, June, and July 1886.
Total Deficiency of Rainfall 50.95 Inches.



Wet Periods. Appendix N^o 26.
Tracks of Areas of Low Pressure. (Storm Centers.)
June 1888, 1890, and 1891.
Total Excess of Rainfall 82.87 Inches.



Average Precipitation in Inches.

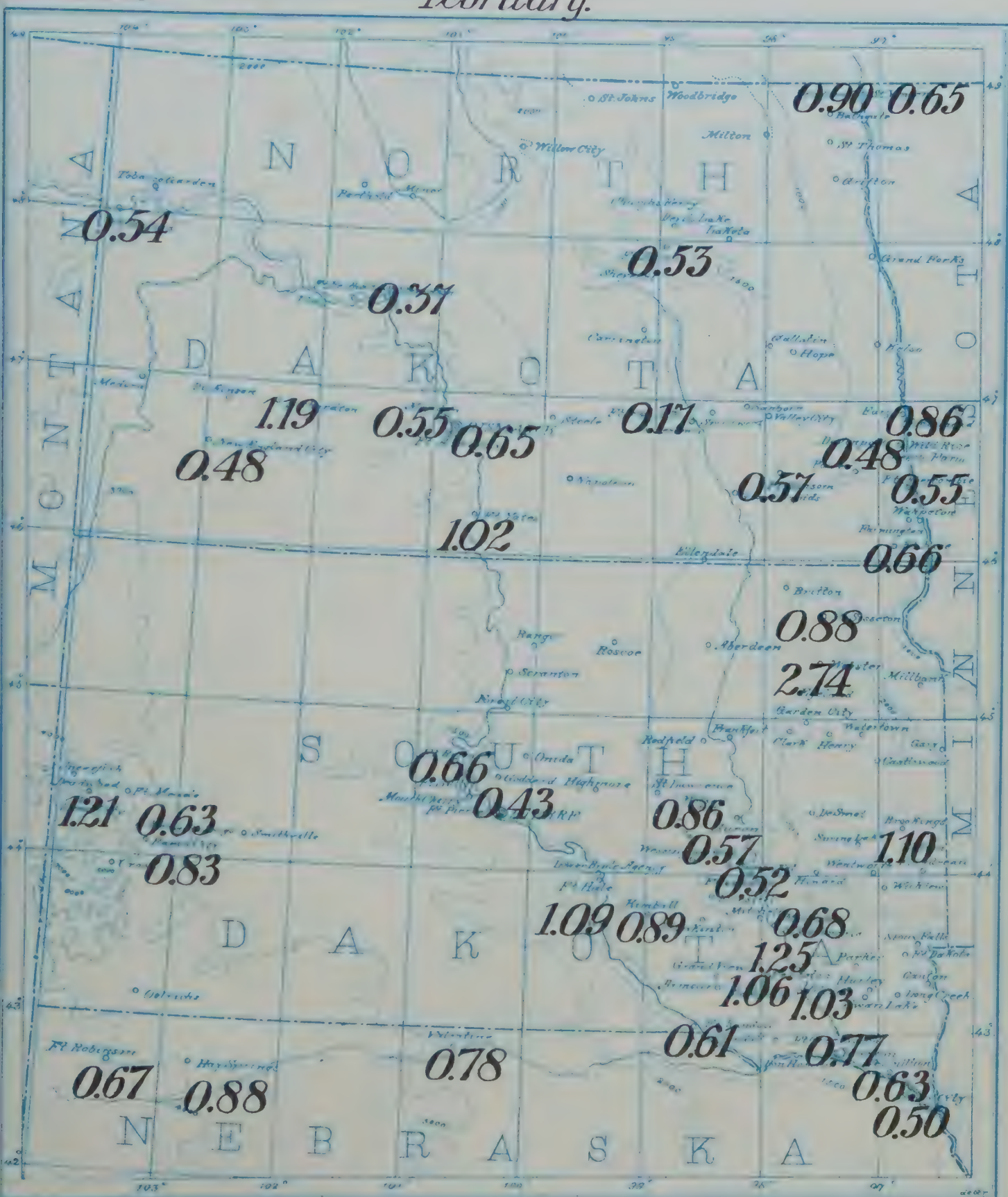
January.

APPENDIX N^o 27.



Average Precipitation in Inches. February.

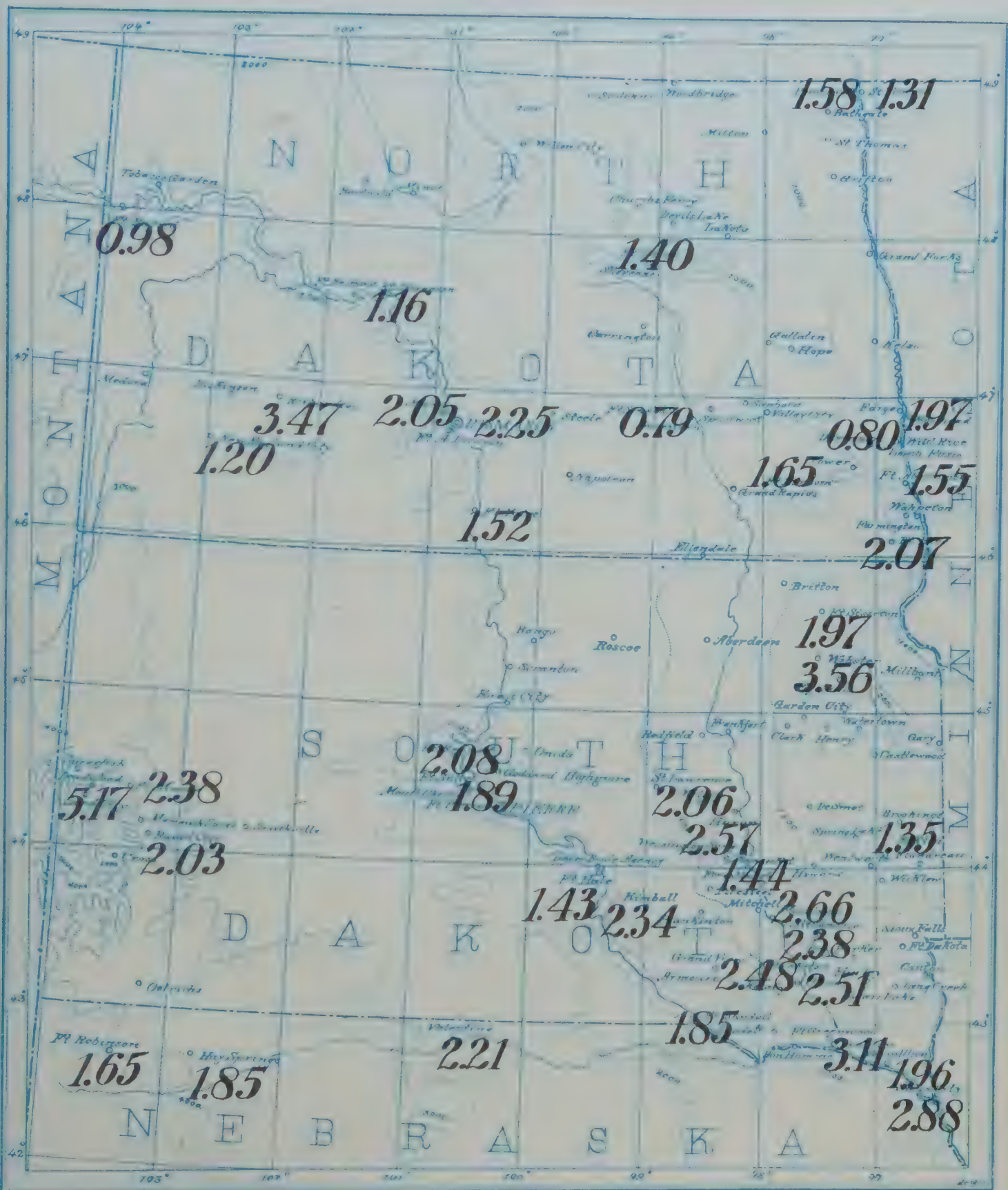
APPENDIX N^o 28.



Average Precipitation in Inches.

April.

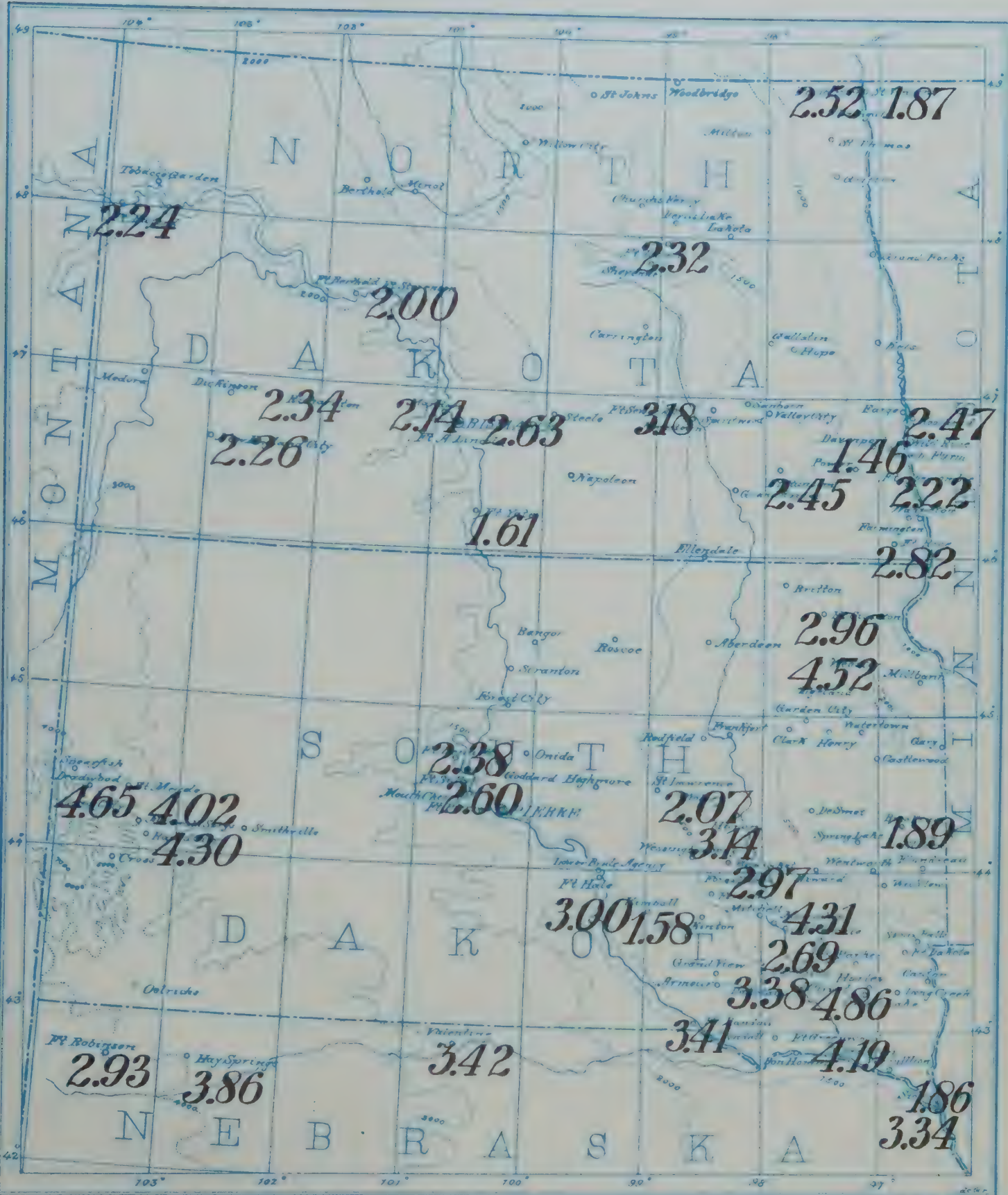
APPENDIX N^o 30.



Average Precipitation in Inches.

May.

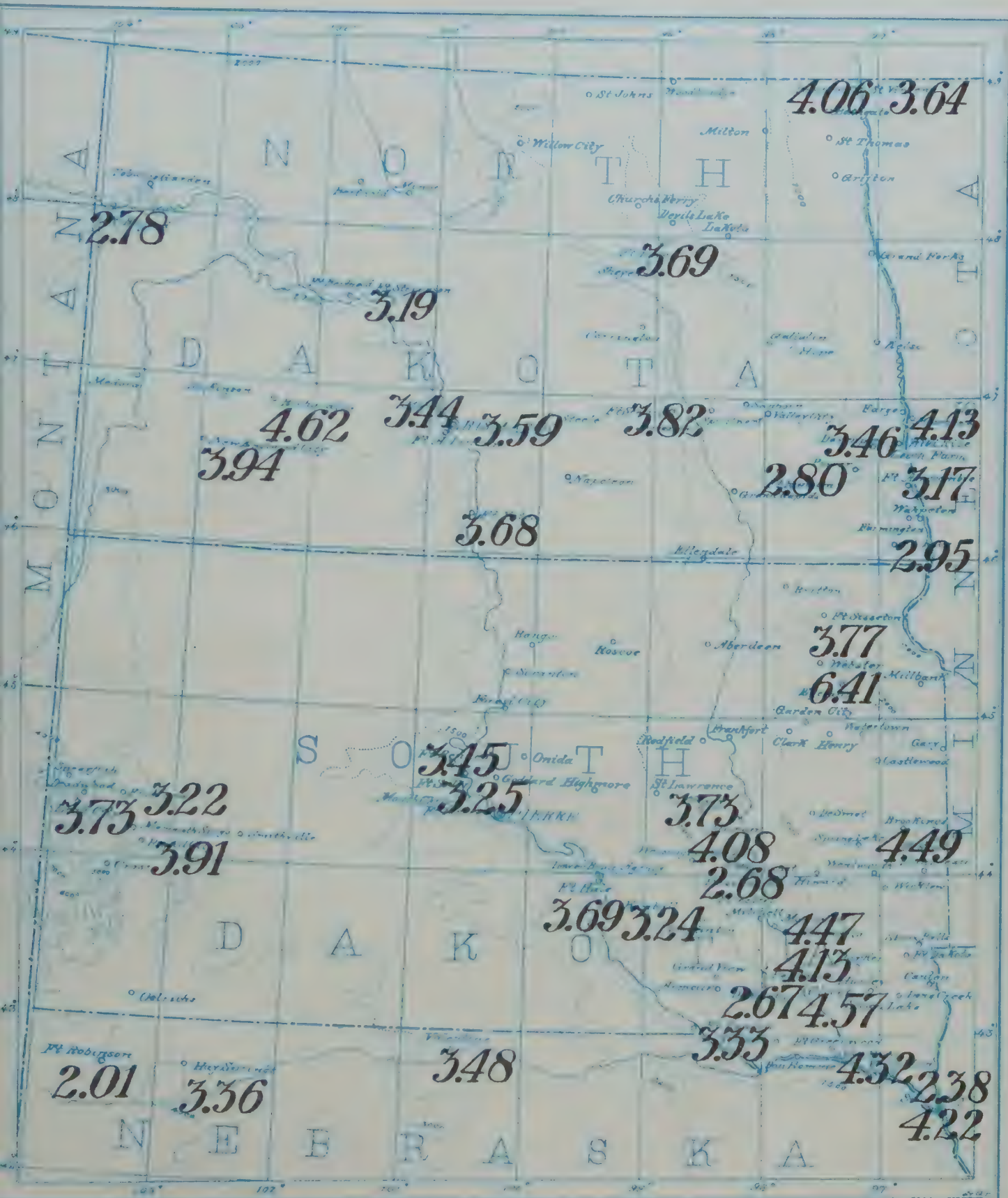
APPENDIX N^o 31.



Average Precipitation in Inches.

June.

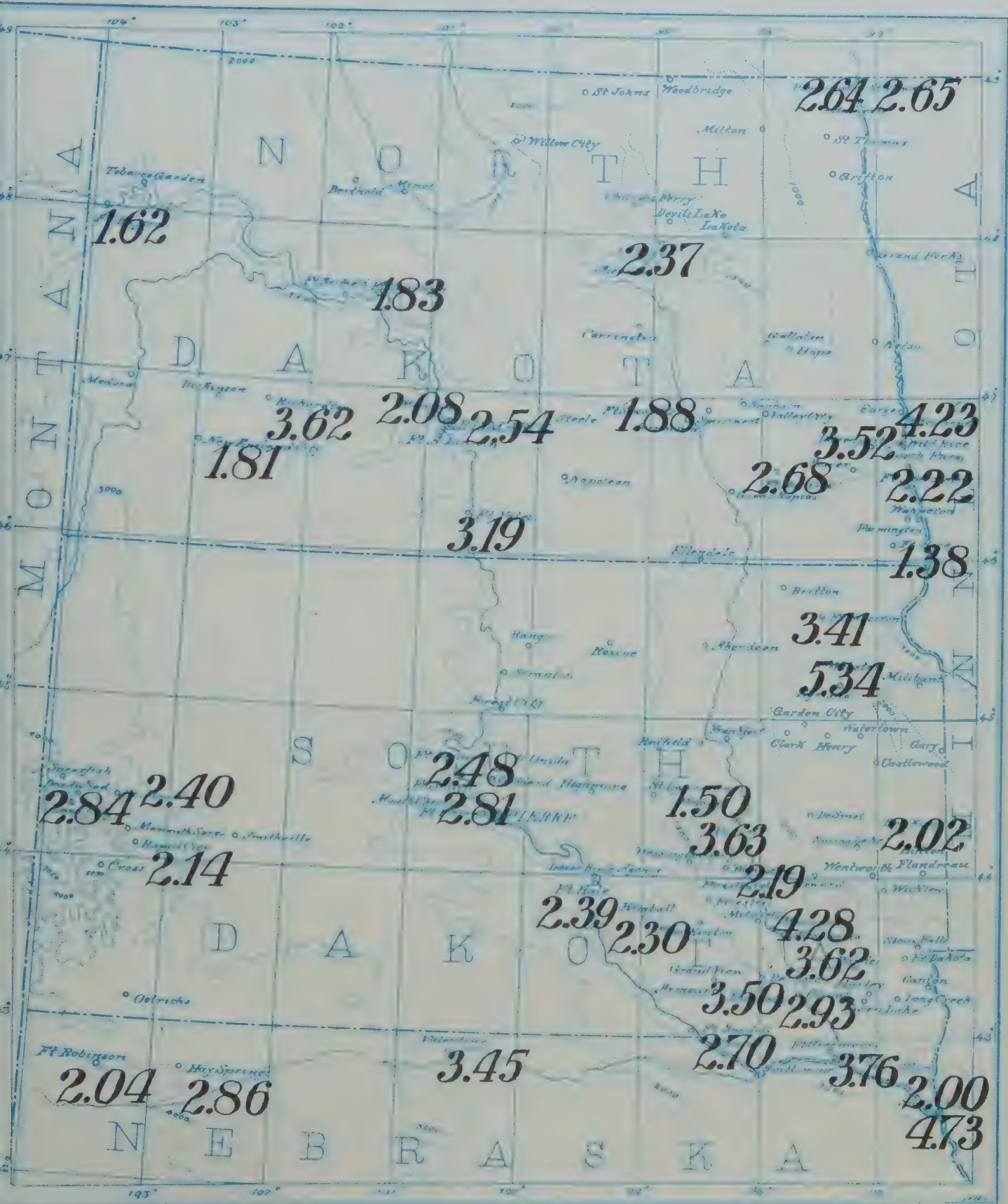
APPENDIX N°32.



Average Precipitation in Inches.

July.

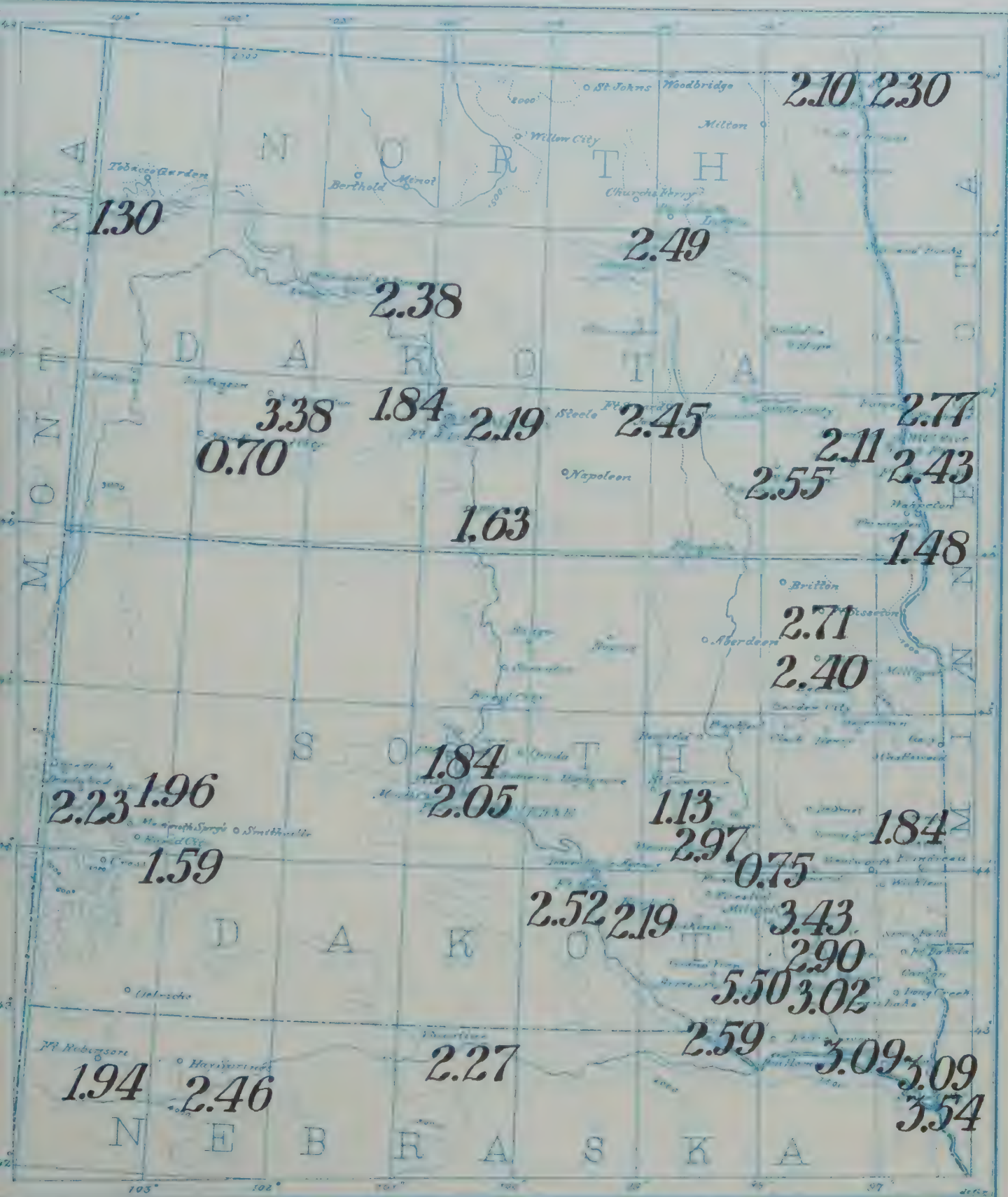
APPENDIX N^o 33.



Average Precipitation in Inches.

August.

APPENDIX No 34.



Average Precipitation in Inches.

September.

APPENDIX N^o 35.



Average Precipitation in Inches.

October.

APPENDIX N^o 36.



Average Precipitation in Inches.

November.

APPENDIX N^o 37.



Average Precipitation in Inches.

December.

APPENDIX N^o 38.



Average Precipitation in Inches.

Annual.

APPENDIX N^o 39.



APPENDIX No. 25.

Excess of precipitation as compared with normal values for many years.

WET PERIODS.

[In inches.]

Stations.	June, 1888.	June, 1890.	June, 1891.	Total ex- cess.
Fort Abraham Lincoln, N. Dak.....	2.52	7.49	1.41	11.42
Fort Buford, N. Dak.....	3.97	2.45	4.30	10.72
Fort Pembina, N. Dak.....	4.31	1.78	2.26	8.35
Fort Totten, N. Dak.....	3.72	3.15	(*)	6.87
Fort Yates, N. Dak.....	4.24	3.16	1.02	8.42
Davenport, N. Dak.....	-1.42	2.29	1.73	2.60
Brookings, S. Dak.....	(*)	3.42	-0.40	3.02
Kimball, S. Dak.....	-1.47	-0.17	6.04	4.40
Huron, S. Dak.....	-2.98	1.79	4.00	2.81
Fort Meade, S. Dak.....	2.28	3.08	1.07	6.43
Fort Randall, S. Dak.....	-0.69	-0.96	3.01	1.36
Fort Sully, S. Dak.....	0.48	3.16	-1.12	2.52
Spearfish, S. Dak.....	(*)	1.63	2.11	3.74
Moorhead, Minn.....	-1.15	2.47	0.19	1.51
St. Vincent, Minn.....	3.73	0.44	4.53	8.70
Sums.....	17.54	35.18	30.15	82.87

*Missing.

APPENDIX No. 40.

Monthly and annual mean temperatures at stations in North Dakota—Continued.

[References: An asterisk (*) indicates incomplete record, but to what extent not accurately known; [], interpolated values. Letters of the alphabet indicate the number of days missing from the record.]

FORT ABERCROMBIE, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1859		9	24	34									
1860									54	48	25	10	
1861	3	12	17	43	53	71	72	68	58	44	28	14	40
1862	1	2	20	35	62	69	73	68	59	44	28	19	40
1863	8	7	21	52	62	70	72	68	57	36	24	10	41
1864	9	20	23	42	60	72	74	72	59	43	26	1	42
1865	6	17	14	38	59	67	73	72	68	47	38	5	42
1866	8	4	14		60				58	49	30	10	
1867	3	4	3	38	53	70	75	75	63	49	32	9	40
1868	4	4	24	35	61	70	79	69	49	40	26	13	40
1869	10	6	13	39	58	64	70	68	60	38	24		
1870	3	10	16	47	63	73	71	67	62	47	36	16	43
1871	6	10	21	39	63	70	73	72	60	45	19	0.3	40
1872	7	10	12	40	57	70	73	68	59	50	21	1	39
1873	1	10	19	36	53	73	72	71	52	40	24	8	38
1874	4	6	14	32	65	71	75	72	63	48	23	15	41
1875	6	6	13	39	60	66	73	69	61	45	19	17	38
1876	5	3	10	40	60	68	74	69	55	39	16	4	37
1877	3	19	17	42	61		72	69	61	38			
Means	4	8	16	39	59	70	73	70	59	44	26	10	40

FORT ABRAHAM LINCOLN, N. DAK.

1873							70	73	55	42	30	16	
1874	12	14	22	39	60	69	76	70	63	50	23	19	43
1875	8	4	16	35	58	64	73	68	59	46	20	22	37
1876	11	9	14	43	60	69	75	72	57	44	24	8	40
1877	6	27	20	40	60	62	73	69	62	47	32	34	44
1878	20	28	40	50	53	70	74	74	59	42	37	11	46
1879	8	4	24		56	69	74	72	57	50	24	5	
1880	12	10	16	33	60	64	68		57	45	18	2	
1881	3	8	24	38	61	66	75	72	53	40	24	24	40
1882	10	21	20	37	52	64	67	71	60	45	28	11	40
1883	5	6	21	42	52	67	69	67	57	39	24	12	38
1884	2	2	18	39	57	71	66	68	57	46	28	2	38
1885	3	1	23	43	57	66	72	64	58	44	30	23	40
1886	6	15	24	46	61	67	76	71	56	48	25	2	40
1887	9	11	15	41	61	70	72	66	59	41	31	9	37
1888	6	10	13	43	51	65	71		58	43	28	25	
1889	14	6	35	48	52	65	70	71	56	46	25	15	42
1890	3	3	19	45	49	67	72	68	58	47	38	26	41
1891	25	8	17	42		60	64						
Means	4	8	21	41	56	66	71	70	58	45	27	14	40

BATHGATE, N. DAK.

1891										43	20	15	
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual mean temperatures at stations in North Dakota—Continued.

FORT BERTHOLD, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1866									58	47	36	17	
1867	10	10	8	46	53								

BISMARCK, N. DAK.

1874										46	18	16	
1875	— 9	— 5	15	34	56	60	68	65	56	43	17	21	35
1876	8	5	12	40	55	62	70	68	54	41	20	6	37
1877	5	27	19	40	57	59	71	69	60	43	30	29	42
1878	18	26	40	47	50	66	73	71	54	40	37	15	45
1879	9	6	24	46	56	65	70	67	55	49	29	— 1	40
1880	15	15	19	36	59	63	68	66	55	42	20	4	38
1881	— 2	10	24	37	60	66	72	70	53	40	25	26	40
1882	12	22	22	40	52	63	67	71	60	45	27	12	41
1883	— 3	8	21	41	50	65	67	66	56	40	26	14	38
1884	4	0	20	39	55	69	64	66	56	46	29	5	38
1885	0	4	26	43	54	62	69	62	57	43	31	23	40
1886	— 4	16	24	45	59	65	75	70	54	47	25	4	40
1887	— 7	— 4	25	43	59	68	70	65	58	41	28	9	38
1888	— 5	11	13	42	49	63	70	65	59	43	29	23	39
1889	15	11	36	49	52	65	69	70	56	47	26	16	43
1890	— 2	4	21	47	51	67	71	67	56	46	37	25	41
1891	24	6	16	47	54	60	65	66	62	46	23	20	41
Means	5	10	22	42	55	65	69	67	57	44	26	15	40

FORT BUFORD, N. DAK.

1866									56	45		16	
1867	9	9	3	44	52	65		74	60	46	31	10	
1868	0	11	34	45	61	71	76	67	49	42	27	16	42
1869	16	18	21	42	58	64	69	68	55	38	26	19	41
1870	7	15	14	50	60	72	73	62	60	39	33	10	41
1871	6	10	27	39	63	68	73	67	57	42	14	2	39
1872	8	15	22	38	51	66	70	68	53	42	17	2	38
1873	2	7	25	37	48	66	67	67	46	37	28	6	36
1874	3	7	27	38	59	67	76	68	58	47	16	16	39
1875	— 10	— 3	16	35	58	62	72	68	56	44	16	23	36
1876	6	4	13	42	57	61	72	67	54	41	22	10	37
1877	8	29	21	40	53	58	70	68	63	49	38	28	44
1878	21	29	38	46	49	66		76	50	37	33	14	
1879	15	5	23	47	54	63	68	66	55	45	28	— 3	39
1880	13	14	18	36	54	61	66	63	53	41	19	1	37
1881	— 2	11	27	40	57	64	70	68	51	39	23	24	39
1882	13	21	23	40	52	62	66	71	58	44	28	14	41
1883	— 4	5	22	41	50	65	66	65	54	39	22	10	36
1884	6	0	20	39	56	70	64	66	52	44	29	2	37
1885	0	5	29	44	54	62	68	62	56	43	34	24	40
1886	— 4	17	26	44	57	66	76	69	53	45	25	8	40
1887	— 4	— 5	27	43	58	66	68	64	58	40	27	9	38
1888	— 6	12	13	41	50	63	69	64	59	44	28	22	38
1889	12	15	38	51	53	66	70	69	54	47	24	15	43
1890	— 4	0	23	45	52	66	72	67	56	45	36	26	40
1891	22	10	19	48	55	60	67	65	59	41	23	20	41
Means	5	10	22	42	55	65	70	67	55	43	26	13	39

CARRINGTON, N. DAK.

1889			35	48	52	65	67	68					
1891								63	61		22	16	

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual mean temperatures at stations in North Dakota—Continued.

CHURCHES FERRY, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891						j62	62	61					

DAVENPORT, N. DAK.

1888				44	50	66	70	64		40	28	20	
1889	11	3	33	47	55	65	70	70	55	44	26	20	42
1890	1	6	20	47	51	70	72	64	55	45			
1891					58	64	66	66					
Means	6	4	26	46	54	66	70	66	55	43	27	20	40

DEVILS LAKE, N. DAK.

1884	c-1	- 4	b15	n35									
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DICKINSON, N. DAK.

1891											23	25	
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ELLENDALE, N. DAK.

1890												25	
1891	23	8	18	51	61	67	70	69	69	47	25	21	44

FARGO, N. DAK.

1872							78	77	57	45	21	-1	
1891						62	k63	65	62	45	20	f20	
Means							70	71	60	45	21	10	

GALLATIN, N. DAK.

1888		18		26	41		67		56	44	26	19	
1889	5	- 3	28	45	48	66	64	69	48	38	23	17	37
1890	- 6	- 3	13	42	46	65	66	65	55	40	29	16	36
Means	-0.5	4	20	41	45	66	66	67	53	41	26	17	37

GRAFTON, N. DAK.

1891	e11	-2			f52	59	62	63	58	42	18	3	
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GRAND FORKS, N. DAK.

1887						67							
1888								69	57				
1889	10	5											
1890			43	47	68	71			43	30	19		
1891	14	2			64		65	n62		19	12		
Means	12	4			66		67	60		24	16		

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual mean temperatures at stations in North Dakota—Continued.

GRAND RAPIDS, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891							68	69	64	44	20	16	

HOPE, N. DAK.

1891					61	62	63	59	44	22		
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KELSO, N. DAK.

1890							69	62	54	44	33	19	
1891	15	3	13	46	54	61	64	65	61	45	20	18	39
Means							66	64	58	44	26	18	

LAKOTA, N. DAK.

1891						61	60	62		44	18	13	
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LEECH FARM, N. DAK.

1888				44	50	66	70	64	57	40	28	20	
1889	11	3	33	47	53	65	70	70	55	44	26	20	41
Means				46	52	66	70	67	56	42	27	20	

MINOT, N. DAK.

1891											17	20	
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NAPOLEON, N. DAK.

1889						65	68	71	54	44	26	21	
1890	1	3	20	45		66	71	64	56	44	32	22	
1891	20	1	14	44	51	60	64	65	61	43	20	15	39
Means	10	4	17	44	.....	61	68	67	57	44	26	19	.....

NEW ENGLAND CITY, N. DAK.

1888 .....	.....	.....	.....	.....	.....	.....	73	64	54	38	26	18	.....
1889	10	11	33	47	50	64	67	71	51	39	26	16	41
1890	3	5	34	45	49	63	69	65	55	41	36	21	39
1891	24	6	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Means	10	7	26	46	50	64	70	67	54	39	29	18	40

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual mean temperatures at stations in North Dakota—Continued.

PEMBINA, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1871								64	53	39	14	- 4	-----
1872	4	6	8	32	50	64	68	65	54	44	18	- 6	34
1873	- 4	4	12	34	52	66	64	64	46	36	16	7	33
1874	- 3	3	12	29	55	64	70	67	56	43	14	6	35
1875	-15	-14	11	33	53	60	65	63	53	38	11	8	30
1876	- 2	- 4	7	36	54	61	68	64	52	37	16	- 6	32
1877	- 6	17	9	33	57	56	68	64	55	40	26	27	37
1878	11	25	36	45	48	63	69	65	51	36	31	9	41
1879	- 1	- 4	16	41	52	63	67	63	50	45	21	-14	33
1880	1	- 1	8	31	56	63	68	63	52	39	14	0	33
1881	- 9	4	18	32	59	64	70	67	51	35	14	13	35
1882	1	9	14	35	51	62	65	69	56				
1883	-14		9	34	46	62	62	62	52	36	17	1	-----
1884	- 9	-10	8	32	49						22	- 1	-----
1885	-10	9	14	37	51	61	65	60	54	39	26	10	35
1886	-12	1	17	44	55	63	70	66	51	45	19	- 1	35
1887	-13	- 4	15	36	57	62	86	60	54	36	20	3	34
1888							70		54	41	26	15	-----
1889	7	- 1	29	41	51	64	66	67	53	42	26	12	38
1890	- 7	- 6	11	42	45	68	69	63	54	44	32	17	36
1891	23	8	18	51	61	67	70	69	69	47	25	21	44
Means	- 3	2	14	37	53	63	68	64	54	40	20	6	35

POWER, N. DAK.

1891						67	68	68	64	46	22	19	-----
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FORT RANSOM, N. DAK.

1868												13	-----
1869	11	11	17	39	57	63	70	66	55	36	23	15	39
1870	3	10	15	48	61	69	70	64	60	42	33	14	41
1871	5	10	23	40	63	68	71	68	58	43	17	2	39
1872	7	11	14	39	54	68	69						-----
Means	6	10	17	42	59	67	70	66	58	40	24	11	39

FORT RICE, N. DAK.

1868							80	68	44	39	27	18	-----
1869	20	20	27	41	56	64	72	71	58	40	24	18	43
1870	7	12	26	49	62	72	72	62	61	43	37	17	43
1871	10	16	26	42	63	70	75	70	61	45	18	1	41
1872	9	15	20	35	49	68	70	70	57	62	24	7	40
1873	4	12	27	41	55	72	72	73	55	41	33	16	42
1874	11	14	24	41	64	70	78	70	64	49	21	20	44
1875	- 6	- 1	18	37	60	64	74	70	60	46	20	22	39
1876	12	9	16	44	62	69	76	72	58	42	25	13	42
1877	13	33	23	47	59	65	76	73	65	46	32	28	47
1878	15	27	41	48	52	68	76	76	59	41			-----
Means	10	16	25	42	58	68	75	70	58	45	26	16	42

RICHARDTON, N. DAK.

1884		0	21	37	55	65	64	64	55	46	30	3	-----
1885	0	10	26	40	48	60	68	62	57	49	32	24	40
1886	- 7	16	25	44		69	77	70		45	25	7	-----
1887	- 8		24		57	50		64		41	28	9	-----
1888	4	12			47	63	70						-----
Means	- 3	10	24	40	52	61	70	65	56	45	29	11	38

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual mean temperatures at stations in North Dakota—Continued.

ST. JOHNS, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891									h 58	41	18	14	

ST. THOMAS, N. DAK.

1891							62	62	57	42	18	14	
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SANBORN, N. DAK.

1890			14										
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FORT SEWARD, N. DAK.

1873	0	5	19	37	52	70	67	68	49	36	24	11	36
1874	5	7	15	36	60	67	73	68	58	44	18	16	39
1875	-11	-8	13	35	57	a 56	g 68	66	54	40	15	25	34
1876	5	1	10	39	57	64	71	68	55	e 40	18	2	36
1877	2	25	15	a 39	57	59	71	69	j 63				.....
Means	0.2	6	14	37	57	63	70	68	56	40	19	14	37

SHEYENNE (SECOND CROSSING), N. DAK.

1872						66	68	73					
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SPIRITWOOD, N. DAK.

1881		6	19	29	i 60								
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STEELE, N. DAK.

1889				47	52	65	70	72	58	48	26	17	
1890	- 2	2	19	47	50	67	72	67	57	46	35	22	40
1891	19	5	16	47	53	61	66	66	63	46			
Means	8	4	18	47	52	64	69	68	59	47	30	20	40

FORT STEVENSON, N. DAK.

1867								77	63	48	28	7	.....
1868	2	12	31	42	59	69	78	69	48	42	28	13	41
1870	4	13	14	47	62	70	72	64	60	40	35	14	41
1871	4	15	24	40	63	68	76	68	57	42	15	- 2	39
1872	8	13	17	38	54	68	69	69	56	46	19	0	38
1873	1	8	22	37	51	67	67	69	49	37	29	7	37
1874	5	6	17	36	59	67	75	68	56	45	17	15	39
1875	-10	- 7	15	32	55	60	68	65	55	42	16	19	34
1876	6	3	13	40	55	61	70	66	53	41	20	6	36
1877	6	24	16	38	51		i 68	66	58	41	27	24	.....
1878	13	27	38	47	50	67	72		52	39	35	12	.....
1879	14	3	20	46	56	65	71	68	56	42	26	- 8	38
1880		10	16	37	60	64	71	67	55	40	17	- 1	.....
1881	- 7	6	23	36	62	66	74	71	52	39	23	22	39
1882	8	18	20	40	53	65	68	72	59	44	28	10	40
1883	5	4	19	43									.....
Means	4	10	20	40	57	66	71	68	55	42	24	9	39

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual mean temperatures at stations in North Dakota—Continued.

TOBACCO GARDEN, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1882		17	21	37	51	62	64	70	58	43	25	14	-----
1883					50	47							-----
Means					50	54							-----

FORT TOTTEN, N. DAK.

1869								65	55	36	21	13	-----
1870	0	7	14	46	59	68	70	67	62	41	35	12	40
1871	-2	5	19	36	62	65	69	71	56	42	15	-2	36
1872	6	10	12	34	51	65	68	66	54	45	17	-3	35
1873	-5	5	16	34	50	66	66	66	48	37	21	8	34
1874	0	5	12	31	58	65	71	65	57	45	15	10	36
1875	-14	-10	11	32	54	60	68	65	55	40	13	13	32
1876	1	1	9	37	55	62	70	66	54	39	17	0	34
1877	0	22	12	37	57	56	69	68	61	42	26	28	40
1878	14	25	38	46	48	66	72	71	56	41	34	11	44
1879	4	-1	20	45	54	65	71	67	55	48	23	-8	37
1880		6	12	33	59	64	68	64	54	41	15	1	-----
1881	-5	6	21	35	60	64	72	70	53	36	18	19	37
1882	4	13	15	36	51	64	66	72	61	44	25	6	38
1883	-11	1	12	36	50	65	67	66	56	40	21	7	34
1884	-2	5	13	36	56	70	63	65	54	43	25	2	36
1885	-5	-2	18	40	51	60	65	60	54	40	26	14	35
1886	-10	7	18	41	54	62	70	67	51	46	20	0	36
1887	-11	-6	19	38	57	66	66	62	55	37	24	3	34
1888	-10	3	8	35	47	61	67	63	56	42	26	19	35
1889	12	11	36	46	53	66	68	69	56	45	25	10	41
1890	-7	-2	14	42	47	67	71	64	55	45	36	(†)	-----
Means	-2	5	17	38	54	64	68	66	55	42	23	8	36

VALLEY CITY, N. DAK.

1891									60	43	21	16	-----
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WAHPETON, N. DAK.

1889							70	70	58	45	27	22	-----
1890	3	8	22	52	54	72	74	68	60	47	35	22	43
1891	18	8	18	50	54	67	64	66	67	49	22	21	42
Means	10	8	20	51	54	70	69	68	62	47	28	22	42

WILD RICE, N. DAK.

1890						68	71	62	51	42	28	15	-----
1891	12	1	12	45	56	63	65	63	59	41	18	17	38
Means						66	68	62	55	42	23	16	-----

WILLOW CITY, N. DAK.

1891									57	42	17	11	-----
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† Station discontinued.

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual mean temperatures at stations in North Dakota—Continued.

WOODBIDGE, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1890										43	15	8	

FORT YATES, N. DAK.

1882	12	23	26	43	55	68	72	72	62	45	28	15	43
1883	1	10	25	44	52	72	75	72	63	42	30	18	42
1884	4	0	22	37	59	72	69	72	60	50	30	10	40
1885	7	4	31	44	58	66	73	66	65	47	33	25	43
1886	— 2	20	28	48	62	67	78	72	59	50	29	7	43
1887	— 2	0	29	47	60	70	74	68	61	42	32	11	41
1888	— 5	15	16	47	51	66	73	68	62	46	29	26	41
1889	17	14	38	49	56	68	72	74	59	50	30	24	46
1890	4	10	26	50	55	69	74	69	59	48	38	26	44
1891	26	10	21	50	58	63	68	70	65	48	26	21	44
Means	6	11	26	46	57	69	73	70	62	47	30	18	43

Monthly and annual mean temperatures at stations in South Dakota.

ABERDEEN, S. DAK.

1890			23	41	52	67	<i>g</i> 73	67	55	43	31	23	
1891	21	4	15	46	56	63	66	67	<i>n</i> 59	46	22	19	40
Means			19	44	54	65	70	67	57	44	26	21	

ALEXANDRIA, S. DAK.

1882			29	45	52	66	67	71	61	47	33	14	41
1883	0.3	10	26	41	51	66	70	68	57	43	31	17	40
1884	8	5											
1889	7	17	26	50	55	67	72	72	72	58	29	30	
1890	7	17	26	50	55	71	76	68	61	48	34	25	45
1891	24	8	21	50	57	65	69	68	68			<i>n</i> 22	
Means	10	10	26	46	54	67	71	69	64	49	32	22	43

ARMOUR, S. DAK.

1889					<i>f</i> 60	<i>h</i> 68	<i>e</i> 72	71					
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FORT BENNETT, S. DAK.

1880										46	23	11	
1881	5	14	24	39	64	69	74	74	57	44	30	31	44
1882	18	29	32	45	54	66	69	73	63	48	31	20	46
1883	6	16	30	46	51	66	70	70	59	43	30	20	42
1884	12	6	28	42	57	72	69	70	62	51	32	9	42
1885	5	11	33	47	56	65	74	66	60	45	34		
1889	18	14	40	53	56	69	72	73	59	50	24	25	46
1890	4	16	30	53	57	71	77	72	62	50	38	27	46
1891	28	13	23	50	58	67	72	73	69	50			
Means	12	15	30	47	57	68	72	71	61	47	30	20	44

BRITTON, S. DAK.

1891									63	46	22	19	
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual mean temperatures at stations in South Dakota—Continued.

BROOKINGS, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1888							70	62	57	43	30	24	-----
1889	14	10	33	48	54	64	70	70	56	44	25	26	43
1890	5	14	20	48	52	67	71	65	58	44	29	21	41
1891	21	7	18	44	56	64	65	66	65	45	24	25	42
Means	13	10	24	47	54	65	69	66	59	44	27	24	42

CANTON, S. DAK.

1889								73	60	49	32	31	-----
1890	14	21	25	51	56	71	75	68	61	49	36	28	46
1891	25	10	23	49	f58	67	-----	-----	-----	-----	-----	-----	-----
Means	20	16	24	50	57	69	-----	70	60	49	34	30	-----

CASTLEWOOD, S. DAK.

1891								66	64	44	20	22	-----
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CLARK, S. DAK.

1889							69	70	55	46	28	26	-----
1890	4	12	23	52	54	67	71	66	57	45	33	23	42
1891	22	6	20	48	57	64	69	70	67	48	22	24	43
Means	13	9	22	50	56	66	70	69	60	45	28	24	43

CROSS, S. DAK.

1890			29	41	52	62	-----	f67	f58	-----	n36	-----	-----
1891		18	a27	-----	53	59	f64	63	62	48	33	30	-----
Means			28	-----	52	60	-----	65	60	-----	34	-----	-----

DAKOTA CITY, S. DAK.

1886					59								-----
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FORT DAKOTA, S. DAK.

1866									56				-----
1868									52	44	28	15	-----
1869	17	18	23	42	59								-----
Means									54				-----

DEADWOOD, S. DAK.

1878	26	32	38	41	46						37	19	-----
1879	22	24	35	46	54	61	68	66	53	-----	33	16	-----
1880	31	24	26	37	52	59	64	63	53	42	21	18	41
1881	16	24	32	42	54	64	-----	68	50	40	31	33	-----
1882	23	28	32	38	47	58	63	66	57	44	32	26	43
1883	16	19	32	38	43	58	62	63	54	40	34	26	40

Monthly and annual mean temperatures at stations in South Dakota—Continued.

DEADWOOD, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884	21	15	28	36	49	63	62	61	53	50	36	12	40
1885	19	22	33	41	49	57	66	60	55	45	41	33	43
1886	15	31	30	41	55	60	71	67	54	48	29	25	44
1887	20	15	36	41	54	64	66	61	57	41	35	23	43
Means	21	23	32	40	50	60	65	65	54	44	33	23	42

DE SMET, S. DAK.

1889 -----	-----	4	32	47	55	66	69	70	43	42	23	23	-----
1890 -----	3	10	21	46	51	69	71	65	57	42	30	21	40
1891 -----	22	6	20	47	56	63	67	67	64	43	22	22	42
Means	12	7	24	47	54	66	69	67	55	42	25	22	41

EGELAND, S. DAK.

1891	60	64	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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ELKTON, S. DAK.

1891	17	8	20	-----	-----	63	65	65	64	45	23	23	-----
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FLANDREAU, S. DAK.

1890						69	72	65	59	47	33		
1891	21	9	20	48	56	64	66	68	66	47	24	26	43
Means						66	69	66	62	47	28		

FORESTBURG, S. DAK.*

1891	57	64	67	68	65	48	27	27	-----
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FOREST CITY, S. DAK.

1891	79	76	70	51	32	-----
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FRANKFORT, S. DAK.

1891	64	48	23	23	-----
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GARDEN CITY, S. DAK.

1887	3	11	16	40	47	65	70	64	56	41	29	9	-----
1888	12	9	25	46	53	-----	-----	-----	-----	-----	-----	-----	-----
1889	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Means	4	10	20	43	50	-----	-----	-----	-----	41	29	22	-----

* Temperatures not reliable.

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual mean temperatures at stations in South Dakota—Continued.

GARY, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891								c 69	67	48	24	24	

GODDARD, S. DAK.

1888											32	25	
1889	16	12											

GRAND VIEW, S. DAK.

1888										54	51	35	
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FORT GREENWOOD (YANKTON INDIAN AGENCY), S. DAK.

1859											34	14	
1860	24	30	44	53	66	71	74	75	60	54	35	16	
1861	12	26	32	48	57								.....
1862						70				49	33	32	.....
Means	18	28	38	50	62	70				52	34	21	.....

FORT HALE, S. DAK.

1879	13	16	36	51	62	70	72	74	62	57	32	4	46
1880	24	25	26	46	66	70	76	73	61	46	22	10	45
1881	1	12	21	41	66	72	76	76	59	47	30	29	44
1882	20	27	33	47	55	69	71	75	66	50	32	19	47
1883	4	12	28	46	52	68	70	70	60	43	32	20	42
1884	12	7	28	43	m 57								.....
Means	12	16	28	46	60	70	73	74	61	49	30	16	45

HENRY, S. DAK.

1886										50	24	8	.....
1887	0	2	28	45	61	68	70	64	57				.....

HIGHMORE, S. DAK.

1887		3	30	47	61	69	c 71	63	58				
1888								67					
1890			23	50	55	69	77	69	60	48	36	26	
1891	25	10	19	45									
Means		6	24	47	58	69	74	66	59				

HOWARD, S. DAK.

1890								66	62	49	37	21	
1891	22	9	21		61	64	67	68	66	48	24	27	
Means								67	64	48	30	24	

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual mean temperatures at stations in South Dakota—Continued.

HURON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1881							72	72	56	45	28	28	
1882	18	25	30	44	52	65	66	70	60	49	31	17	44
1883	3	13	28	45	50	65	69	67	56	44	31	18	41
1884	9	6	26	42	56	69	67	66	60	50	31	9	41
1885	4	7	30	46	55	66	72	64	59	43	30	24	42
1886	0	19	27	46	60	65	74	70	59	51	27	8	42
1887	— 0.4	4	30	47	62	70	72	66	60	42	30	10	41
1888	— 1	14	19	45	50	66	74	67	59	45	33	24	41
1889	13	11	36	50	55	66	71	72	57	47	28	26	44
1890	3	13	25	50	54	69	74	68	60	47	35	24	43
1891	24	7	19	49	56	64	67	68	66	48	24	24	43
Means	7	12	27	46	55	66	71	68	59	46	30	19	42

KIMBALL, S. DAK.

1889	13	11	33	47	54	68	71	70	56	44	24	26	43
1890	4	13	24	48	54	71	74	67	58	43	30	22	42
1891	22	6	18	46	57	65	69	67	66	50	28	28	44
Means	13	10	25	47	55	68	71	68	60	46	27	25	43

LEAD CITY, S. DAK.

1878						58	67	66	49	40			
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LONG CREEK, S. DAK.

1888					b50	g64	g70	i65	g56				
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LOWER BRULE AGENCY, S. DAK.

1875									63	49	26	28	
1876	17	18	19	48	64	70	78	73	59	46	27	12	44
1877	10	32	24	46	59	65	76	74	65	44	32	29	46
1878	21	31	44	50	53	67	77	75	60	47	38	15	48
Means	16	27	29	48	59	67	77	74	62	46	31	21	46

MAMMOTH SPRINGS, S. DAK.

1883									63	49	40	31	
1884	25	10	22										

FORT MEADE, S. DAK.

1879							75	73	62	55	36	17	
1880	31	24	27	41		65	72	71	60	48	20	13	
1881	13	21	35	43	57	67	74	73	54	44	34	36	46
1882	22	30	35	39	52	62	69	72	51	44	34	23	45
1883	16	22	31	42	50	65	69	72	61	45	34	25	45
1884	20	8	27	38	52	66	65	64	55	49	37	6	41
1885	14	15	32	46	54	62	71	65	61	48	40	33	45
1886	7	31	30	44	61	67	79	78	59	48	31	20	46

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual mean temperatures at stations in South Dakota—Continued.

FORT MEADE, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1887	17	16	37	46	60	68	71	65	61	43	34	22	45
1888	14	28	22	-----	-----	69	-----	66	59	45	24	24	-----
1889	22	21	36	47	49	63	68	71	57	51	32	33	46
1890	12	20	32	47	54	66	76	71	60	48	39	32	46
1891	31	13	25	48	56	62	68	70	65	51	36	33	46
Means	18	21	31	44	54	65	71	70	59	48	33	24	45

MILLBANK, S. DAK.

1890	-----	-----	-----	40	47	69	71	65	64	48	38	29	-----
1891	27	14	26	56	65	69	72	73	63	50	24	24	47
Means	-----	-----	-----	48	56	69	72	69	64	49	31	26	-----

MITCHELL, S. DAK.

1891	-----	-----	-----	-----	-----	-----	68	68	67	49	30	28	-----
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OELRICHS, S. DAK.

1890	-----	-----	34	46	53	-----	74	69	60	47	35	29	-----
1891	25	10	23	48	58	63	69	71	64	46	31	27	45
Means	-----	-----	28	47	56	-----	72	70	62	46	33	28	-----

OLIVET, S. DAK.

1877	-----	-----	-----	-----	-----	66	71	71	63	46	30	30	-----
1878	21	31	42	49	55	67	76	74	60	47	37	13	48
1879	14	18	36	50	63	69	76	72	61	55	31	7	46
1880	26	24	29	46	66	71	73	72	60	44	21	11	45
1881	2	11	20	38	64	71	75	76	59	47	30	29	43
1882	18	25	32	47	54	69	69	72	63	51	31	[15]	[46]
Means	16	22	32	46	60	69	73	73	61	48	30	17	45

ONIDA, S. DAK.

1889	-----	-----	34	45	48	65	71	74	56	46	25	24	-----
1890	1	12	23	46	51	-----	74	66	58	44	32	-----	-----
1891	23	6	19	45	54	63	64	66	62	44	22	19	41
Means	12	9	25	45	51	64	70	69	59	45	26	22	41

PARKER, S. DAK.

1891	-----	-----	-----	-----	-----	-----	68	69	67	-----	29	28	-----
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual mean temperatures at stations in South Dakota—Continued.

PARKSTON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1887	[7]	6	30	49	63	70	74	70	63	45	33	14	[44]
1888	3	20	23	47	52	68	77	[66]	[56]	[42]	32	24	[42]
1889	16	14	35	[46]	[51]	65	68	70	55	44	24	32	[43]
1890	9	18	26	50	55	68	71					30	
1891	28	13	24	48	57	64	68	69	67	49	30	28	45
Means	13	14	28	48	56	67	72	69	60	45	30	32	44

PIERRE, S. DAK.

1891							71	72	68	50	30	28	-----
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FORT PIERRE, S. DAK.

1854	13	31	37	57	63	68							
1855							77	69	64	48	32	14	
1856	4	24	30	49	61	75	79	72	61	57	30	9	46
1857	6	15	33	39	59								
Means	8	23	33	48	61	72	78	70	62	52	31	12	46

PLANKINTON, S. DAK.

1891						65	69	69					-----
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FORT RANDALL, S. DAK.

1856											31	9	-----
1857	3	15	28	34	54	68	76	73	63	49	31	28	44
1858	28	11	42	47	55	74	78	73	64	46	30	20	47
1859	23	21	34	40	62	71	82	73	62	50	33	12	47
1860	23	29	44	50	64	69	74	74	60	53	33	16	49
1861	12	26	31	49	58	74	78	74	62	49	32	26	48
1862	9	14	28	39	62	72	78	74	64	51	34	31	46
1863	23	21	35	51	65	70	75	77	65	41	35	18	48
1864	20	33	32	46	64	77	81	78	66	57	35	16	50
1865	20	28	26	45	64				76				
1866									58	52	37	22	-----
1867	16	17	9	46	55	71	77	78	64	54	40	27	46
1868	9	22	38	44	63	71	82	73	57	40	34	24	47
1869	29	26	33	46	61	68	75	72	61	42	33	27	48
1870	19	29	25	51	67	75	82	71	64	50	43	23	50
1871	22	28	38	48	[64]	76	76	74	66	51	26	15	[49]
1872	17	27	29	50	62	73	75	76	65	58	28	16	48
1873	18	24	37	42	56	76	75	77	60	47	36	20	47
1874	18	22	32	45	68	75	81	78	65	51	32	26	49
1875	3	6	25	43	62	67	73	70	63	50	29	30	43
1876	21	24	22	50	63	68	75	75	60	47	30	16	46
1877	15	35	29	48	60	66	75	73	66	47	33	31	48
1878	24	33	45	51	55	68	77	75	62	49	40	18	50
1879	18	17	38	53	64	71	74	74	63	60	33	8	48
1880	29	27	31	48	68	70	76	75	63	48	23	4	47
1881	4	14	23	41	66	72	76	80	61	49	33	32	46
1882	23	30	36	48	56	70	73	74	65	53	34	21	48
1883	7	18	32	49	55	70	73	72	60	46	36	25	45
1884	14	8	30	46	61	73	73	71	65	54	36	12	45
1885	9	14	35	50	60	69	76	68	64	48	37	29	47
1886	8	26	30	50	65	70	80	76	64	55	32	17	48
1887	10	23	34	51	65	76	75	68	61	46	35	15	47
1888	6	23	28	51	[54]	[71]	[79]	70	61	47	35	28	[46]
1889	20	19	42	55	61	71	75	70	60	51	31	35	49
1890	13	21	30	51	55	71	80	72	65	54	40	31	49
1891	28	12	25	50	59	66	69	68	68	53	32	30	47
Means	16	22	32	47	61	71	76	74	63	50	33	22	47

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual mean temperatures at stations in South Dakota—Continued.

RAPID CITY, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1881			35	46	69	67	74	74	59	46	34	33	-----
1882	25	33	37	40	51	63	70	73	63	50	32	26	47
1883	13	16	35	42	48	58							-----
1888	11	28	25	50	49	64	71	66	62	44	31	29	44
1889	23	21	40	50	52	65	69	72	58	51	33	35	47
1889	13	22	33	47	54	66	74	70	60	49	42	34	47
1890	13	22	33	47	54	66	74	70	60	49	42	34	47
1891	32	12	25	47	55	63	68	69	64	50	35	32	46
Means	20	22	33	46	53	64	71	71	61	48	34	31	46

REDFIELD, S. DAK.

1889				d 46	54	j 65							
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ROSCOE, S. DAK.

1889					h 51	g 65	e 69	l 70	d 54	d 45			
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ST. LAWRENCE, S. DAK.

1890								j 72	d 58	m 46		27	-----
1891	26	9	21	51	59	66	71	70			28	30	-----
Means								71					-----

SCRANTON, S. DAK.

1889												20	-----
1890	4	10	27	50	56	70	77	69		45	33	25	-----
1891	25	8	20	47									-----
Means	14	9	24	48								22	-----

SIOUX FALLS, S. DAK.

1890						72	74	67	60	47	33	24	-----
1891	23	9	22	47			66	67	66	49	25	26	-----
Means							70	67	63	48	29	25	-----

FORT SISSETON (FORMERLY FORT WADSWORTH), S. DAK.

1866									56	46	34	14	-----
1867	— 1	6	2	38	51	66	73	72	60	49	29		-----
1869	14	12	16	38	55	62	69	67	56	36	23	15	39
1870	3	11	15	44	59	68	69	63	62	43	35	17	41
1871	6	14	23	41	62	66	70	68	57	43	17	1	39
1872	7	12	13	39	54	66	70	68	56	48	18	1	38
1873	1	7	20	35	51	70	69	69	51	36	25	10	37
1874	5	8	18	36	61	67	74	69	60	46	20	16	40
1875	—11	— 7	15	35	57	60	70	66	57	42	19	19	35
1876	9	5	13	40	57	62	71	67	53	40		4	-----
1877	2	25	15	40				69					-----
1878	14		39	45	50	64	72			40		8	-----
1879	6	4	25	47	55		70		54	54	26	— 4	-----
1880	14	12	18		60	65	69	66	56	42	16	3	-----
1881	— 3		18	33	61	65	72	70	53	40	22	23	-----

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual mean temperatures at stations in South Dakota—Continued.

FORT SISSETON (FORMERLY FORT WADSWORTH), S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1882	9	19	20	39	51	63	65	70	59	46	26	9	40
1883	— 6	6	18	40	49	63	68	67	56	40	27	12	37
1884	0	— 3	17	38	56	70	65	65	57	46	27	3	37
1885	— 3	1	23	42	53	63	70	62	58	43	28	20	38
1886	— 5	12	23	46	58	65	74	70	56	49	24	4	40
1887	— 6	1	25	43	60	68	69	62	57	39	28	6	38
1888	— 7	6	13	40	49	64	70	64	58	43	31	22	38
1889	10	5	33	46									
Means	3	8	19	40	55	65	70	67	57	43	25	10	38

SMITHVILLE, S. DAK.

1881						78	175	80	62	j54	31	30	
1882	21	29	k35	143		e65	f71	d72	e66				
1883		n22	d29		d51	162							
Means		26	32			68	73	76	64				

SPEARFISH, S. DAK.

1880	24	23	39	50	55	69	70	74	57	51	33	34	48
1890	15	22	33	48	54	68	76	72	60	48	44	35	48
1891	32	13	25	47	56	62	68	70	63	49	35	32	46
Means	24	19	32	48	55	66	71	72	60	49	37	34	47

SPRING LAKE, S. DAK.

1888											17	17	
1889	16	15	34	48	54	66	69	70					

FORT SULLY, S. DAK.

1866	12	17	21	45									
1868									55		34	22	
1869	24	20	29	41	58	65	73	73	60	42	29	22	45
1870	13	25	20	49	62	71	80	71	67	50	44	30	49
1871	19	24	34	48	68	76	80	77	67	52	25	14	49
1872	17	25	28	44	58	70	74	72	62	52	24	12	45
1873	10	15	32	42	54	74	74	76	57	42	35	15	44
1874	16	20	28	44	63	70	79	76	65	51	26	27	47
1875	0	4	22	39	60	66	74	71	61	49	24	27	41
1876	19		16		62	68	76	77	59	47	28	14	
1877	14	33	24	45	59	61	75	73	65	45	32	29	46
1878	22	31	44	50	53	68	77	74	60	48	39	17	49
1879	15	16	36	52	61	71	75	72	61	56	32	3	46
1880	23	24	28	44	61	69	75	72	62	46	21	8	45
1881	2	13	22	40	65	70	75	75	58	45	29	30	45
1882	23	27	30	44	54	73	73	78	67	53	31	20	48
1883	8	17	31	37	53	68	72	71	63	47	34	21	44
1884	12	6	27	41	60	74	71	71	64	56	36	9	44
1885	7	12	36	51	60	68	76	69	63	49	35	26	46
1886	2	24	29	47	62	68	76	76	61	52	30	9	45
1887	3	2	34	56	64	71	75	68	63	46	33	14	44
1888	2	18	20	50	52	67	75	69	62	47	34	26	44
1889	17	15	38	52	55	68	72	74	60	50	28	28	47
1890	2	15	29	51	56	70	77	72	61	50	39	28	46
1891	28	9	22	49	57	65	72	73	68	49	28	27	46
Means	13	18	28	46	59	69	75	73	62	49	31	20	45

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly and annual mean temperatures at stations in South Dakota—Continued.

TYNDALL, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891								70	68	50	39	29	.....

VERMILLION, S. DAK.

1884	f12	13	d32	45	d60	h68	-----	l72	-----	d55	36	g34	-----
1885	l6	m11	j32	j51	g62	-----	h77	l67	62	a48	39	a28	-----
1886	a5	24	b28	f52	62	b68	b75	g73	e63	e57	e31	g14	46
1889	11	22	26	50	56	71	75	67	58	46	34	26	45
1891	24	12	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Means	12	16	30	50	60	69	76	70	61	52	35	26	46

WEBSTER, S. DAK.

1882	-----	-----	-----	-----	-----	71	73	78	70	56	33	15	-----
1883	— 1	11	25	46	51	69	77	73	63	45	33	14	42
1884	2	0	19	38	58	77	73	71	62	52	35	9	41
1885	4	7	28	46	58	67	75	67	62	45	31	23	43
1886	0	18	29	50	63	69	77	72	59	51	23	1	43
1887	—13	1	29	45	61	69	72	64	58	40	31	11	39
1888	— 2	12	19	43	52	67	74	66	58	43	32	23	41
1889	11	7	34	49	55	66	71	74	59	48	29	27	44
1890	6	15	24	50	53	69	73	68	61	47	35	26	44
1891	25	13	22	50	-----	-----	64	69	70	50	27	28	-----
Means	4	9	25	46	56	69	73	70	62	48	31	18	43

WENTWORTH, S. DAK.

1883	-----	-----	-----	44	74	f66	70	-----	c56	-----	-----	-----	-----
1885	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1891	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24	25	-----

WESSINGTON SPRINGS, S. DAK.

1891	-----	-----	-----	-----	-----	-----	68	69	68	51	27	28	-----
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WICKLOW, S. DAK.

1882	-----	-----	-----	-----	-----	-----	l73	76	63	47	28	20	-----
1883	0	10	-----	43	-----	-----	-----	-----	-----	-----	-----	-----	-----

WOLSEY, S. DAK.

1889	11	9	33	48	55	67	74	71	55	44	23	22	43
1890	4	13	26	49	55	71	76	70	60	46	32	24	44
1891	23	6	20	48	58	66	71	70	67	47	24	22	44
Means	13	9	26	48	56	68	74	70	61	46	26	23	43

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly and annual mean temperatures at stations in South Dakota—Continued.

WOONSOCKET, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1888				46	51	68	75	68	59	42	29	22	
1889	12	10	34	49	56	67	71	72	56	44	25	26	44
1890	4	13	24	49	54	69	74	68	59	44	31	23	43
Means	8	12	29	48	54	68	73	69	58	43	28	24	44

YANKTON, S. DAK.

1859													
1860	24	30	44	52	66	72	74	74	59	52	34	14	
1861	11	25	[32]	[49]	[58]						33	16	50
1862						70				50	32	31	
1873				40	54	73	74	77	60	46	36	20	
1874	18	19	31	44	64	71	78	73	61	49	30	23	47
1875	0	2	23	41	61	66	70	68	60	47	26	28	43
1876	20	21	20	46	61	66	73	72	59	45	27	12	44
1877	14	34	27	45	59	65	73	70	64	47	32	32	47
1878	23	33	44	50	54	66	75	73	60	48	39	16	48
1879	16	19	36	50	63	69	75	73	60	59	35	12	47
1880	29	22	31	47	66	70	75	73	62	46	24	15	47
1881	6	14	22	39	65	72	75	77	60	49	32	33	45
1882	23	29	34	48	54	68	69	72	64	53	35	19	47
1883	7	17	30	48	53	67	72	71	59	46	35	24	44
1884	14	12	29	44	60	72	71	69	64	54	34	12	45
1885	9	13	33	47	57	67	73	66	62	47	35	27	45
1886	5	23	28	48	62	68	76	73	62	55	31	14	45
1887	8	11	34	51	64	71	74	69	62	47	35	17	45
1888	5	22	24	48	52	69	76	71	63	49	36	29	45
1889	20	18	39	52	60	69	73	73	61	50	32	34	48
1890	11	21	29	51	56	71	76	70	62	50	39	31	47
1891	27	12	23	51	58	65	70	[69]	68	52	30	31	46
Means	14	20	31	47	59	69	74	72	62	50	33	22	46

Mean monthly and annual temperatures at two stations in Minnesota.

MOORHEAD, MINN.

1881	— 3	7	19	34	60	65	71	68	53	40	20	20	38
1882	6	17	19	39	51	63	65	69	58	46	26	6	39
1883	—10	3	14	39	48	62	66	63	53	40	23	6	34
1884	— 4	— 4	15	39	54	69	64	64	57	44	25	6	36
1885	— 1	3	22	41	53	62	68	60	56	41	28	15	37
1886	— 7	8	24	46	56	63	70	67	54	48	22	0	38
1887	— 9	— 2	22	41	60	68	69	63	56	38	26	6	37
1888	— 9	— 4	12	38	48	64	69	63	57	43	29	20	37
1889	10	0	33	45	52	64	67	69	54	44	25	20	40
1890	— 1	5	18	45	48	68	69	63	55	45	33	19	39
1891	14	2	14	47	54	62	63	65	62	45	20	18	39
Mean	— 1	4	19	41	53	65	67	65	56	43	25	12	37

ST. VINCENT, MINN.

1880									52	40	16	2	
1881	— 6	9	19	31	58	62	69	66	51	37	16	14	36
1882	0	7	12	33	48	59	62	66	55	42	24	5	34
1883	—13	— 2	9	34	46	61	62	60	51	37	18	1	30
1884	— 8	— 8	11	36	53	66	61	62	54	42	22	1	33
1885	—10	— 4	15	37	51	59	63	58	53	40	28	12	34
1886	—11	5	18	44	55	62	69	64	50	46	19	— 1	35
1887	—13	— 4	16	38	58	65	66	61	55	35	20	2	33
1888	—14	0	8	35	46	63	66	61	55	41	25	15	33

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Mean monthly and annual mean temperatures at two stations in Minnesota—Continued.

ST. VINCENT, MINN.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1889	7	— 3	30	43	50	63	65	66	52	40	24	11	37
1890	—10	— 3	12	41	45	69	69	60	51	42	28	19	35
1891	11	— 3	12	44	51	61	61	62	58	43	19	13	36
Mean	— 6	— 1	15	38	51	63	65	62	53	40	22	8	34

Mean monthly and annual temperatures at three stations in Nebraska.

HAY SPRINGS, NEBR.

1886	10	29	28	41	59	64	75	69	58	47	26	20	44
1887	17	14	37	44	56	66	71	65	59	40	29	18	43
1888	9	28	25	48	49	67	71	65	60	44	30	28	44
1889	21	19	37	47	52	64	70	70	55	47	28	32	45
1889	12	23	33	46	53	55	74	68	60	45	34	28	45
1890	25	11	22	46	55	60	66	68	61	46	31	27	43
1891													
Mean	16	21	30	45	54	64	71	68	59	45	30	26	44

FORT ROBINSON, NEBR.

1883							72	71	60	41	28	31	46
1884	23	18	32	42	57	72	74	70	63	54	38	12	48
1885	19	23	37	47	56	66	74	71	63	49	41	34	48
1886	16	34	33	47	66	68	78	74	56	50	32	25	48
1887	21	18	41	49	61	72	71	68	63	45	34	24	47
1888	17	32	28	53	52	[67]	73	65	61	48	37	35	[47]
1889	26	27	43	50	53	65	70	71	58	52	32	38	49
1889	16	28	37	48	56	67	76	70	61	49	34	33	49
1890	29	16	25	48	57	62	67	70	68	49			
1891													
Mean	21	24	34	48	57	67	73	70	61	49	36	29	47

VALENTINE, NEBR.

1885									60	46	37	29	45
1886	7	27	27	44	61	65	76	72	60	52	30	19	45
1887	15	13	36	47	61	70	72	67	62	45	34	20	45
1888	9	28	25	50	51	68	74	68	61	[43]	41	34	[45]
1889	25	25	44	52	55	66	72	73	58	50	32	36	49
1889	11	23	32	50	55	69	76	69	62	49	38	32	47
1890	28	13	22	48	57	64	68	69	65	51	33	31	46
1891													
Mean	16	22	31	48	57	67	73	70	61	48	35	29	46

Mean monthly and annual temperatures at one station in Iowa.

SIOUX CITY, IOWA.

1857								71	k 66		27	28	
1858	28	14	41	44	54	71	73	70	62	49	27	19	46
1859	21												
1861	9	19	28	47	55	70	70	71	60	47	31	22	44
1862	7	17	33	38	59	68	73	69	62	49	32	28	44
1864	22	19	32									22	
1865	15	28	31	45	61								
1878	*29	*39	*51	*59									
1889							76	73	61	50	33	35	
1890	14	23	28	52	58	72	76	69	62	50	40	32	48
1891	28	13	25	53	59	58	69	70	68	50	30	31	47
Mean	19	22	34	43	58	70	73	70	63	49	31	27	47

* Mean temperatures from one observation daily at noon.

APPENDIX No. 41.

Normal monthly and annual temperatures from the stations of longest record.

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
NORTH DAKOTA.													
Abercrombie, Fort	4	8	16	39	59	70	73	70	59	44	26	10	40
Abraham Lincoln, Fort.	4	8	21	41	56	66	71	70	58	45	27	14	40
Bismarck	5	10	22	42	55	64	69	67	57	44	26	15	40
Buford, Fort	5	10	22	42	55	65	70	67	55	43	26	13	39
Davenport	6	4	26	46	54	66	70	66	55	43	26	20	40
Gallatin	— 0.5	4	20	41	45	66	66	67	53	41	26	17	37
New England City	10	7	26	46	50	64	70	67	54	39	29	18	40
Pembina, Fort	— 3	2	14	37	53	63	68	64	54	40	20	6	35
Ransom, Fort	6	10	17	42	59	67	70	66	58	40	24	11	39
Rice, Fort	10	16	25	42	58	68	75	70	58	45	26	16	42
Richardton	— 3	10	24	40	52	61	70	65	56	45	29	11	38
Seward, Fort	— 0.2	6	14	36	57	63	70	68	56	40	19	14	37
Stevenson, Fort	4	10	20	40	57	66	71	68	55	42	24	9	39
Totten, Fort	— 2	5	17	38	54	64	68	66	55	42	23	8	36
Yates, Fort	6	11	26	46	57	69	73	70	62	47	30	18	43
Means	3	8	21	41	55	65	70	67	56	43	25	13	39
SOUTH DAKOTA.													
Alexandria	10	10	26	46	54	67	71	69	61	49	32	22	43
Bennett, Fort	12	15	30	47	57	68	72	71	61	47	30	20	44
Brookings	13	10	24	47	54	65	69	66	59	44	27	24	42
Deadwood	21	23	32	40	50	60	65	65	54	44	33	23	42
Hale, Fort	12	16	28	46	60	70	73	74	61	49	30	16	45
Huron	7	12	27	46	55	66	71	68	59	46	30	19	42
Kimball	13	10	25	47	55	68	71	68	60	46	27	25	43
Meade, Fort	18	21	31	44	54	65	71	70	59	48	33	24	45
Olivet	16	22	32	46	60	69	73	73	61	46	30	17	45
Parkston	13	14	28	48	56	67	72	69	60	45	30	32	44
Randall, Fort	16	22	32	47	61	71	76	74	63	50	33	22	47
Rapid City	20	22	33	46	53	64	71	71	61	48	34	31	46
Sisseton, Fort	3	8	19	40	55	65	70	67	57	43	25	10	38
Sully, Fort	13	18	28	46	59	69	75	72	62	49	31	20	45
Vermillion	12	16	30	50	60	69	76	70	61	52	35	26	46
Webster	4	9	25	46	56	69	73	70	62	48	31	18	43
Woonsocket	8	12	29	48	54	68	73	69	58	43	28	24	44
Yankton	14	20	31	47	59	69	74	72	62	50	33	22	46
Means	13	16	28	46	56	67	72	70	60	47	31	22	44
MINNESOTA.													
Moorhead	— 1	4	19	41	53	65	67	65	56	43	25	12	37
St. Vincent	— 6	— 1	15	38	61	63	65	62	53	40	22	8	34
IOWA.													
Sioux City	19	22	34	48	58	70	73	70	63	49	31	27	47
NEBRASKA.													
Hay Springs	16	21	30	45	54	64	71	68	59	45	30	26	44
Robinson, Fort	21	24	34	48	57	67	73	70	61	49	36	29	47
Valentine	16	22	31	48	57	67	73	70	61	48	35	29	46

APPENDIX No. 42.

Temperature normals (degrees Fahrenheit), Weather Bureau, 10 years, 1881 to 1890.

[Computed from the averages of the readings of self-registering maximum and minimum thermometers.]

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
NORTH DAKOTA.													
Bismarck	1	8	24	43	54	65	70	68	57	44	29	14	40
Buford, Fort	0.2	8	25	44	54	65	70	68	56	44	28	13	40
Means	0.6	8	24	44	54	65	70	68	56	44	28	14	40
SOUTH DAKOTA.													
Deadwood	14	23	33	46	54	66	71	68	60	50	36	27	46
Huron	5	12	29	47	55	67	72	69	60	47	31	18	43
Sully, Fort	6	14	30	49	57	69	76	72	63	50	34	21	45
Yankton	11	19	31	48	59	70	74	72	63	50	35	24	46
Means	9	17	31	48	56	68	73	70	62	49	34	22	45
MINNESOTA.													
Moorhead	3	4	20	41	53	65	67	62	54	42	25	11	37
St. Vincent	8	1	15	37	51	63	66	63	53	40	22	6	34

APPENDIX No. 43.

Temperature normals (degrees Fahrenheit), Hazen's tables, 8 years, 1879 to 1886.

[Computed from synchronous observations, at 7 a. m., 3, and 11 p. m.]

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
NORTH DAKOTA.													
Bismarck	2	9	23	40	56	65	69	67	56	43	26	12	39
Buford, Fort	2	8	24	41	55	65	68	66	54	42	26	12	39
Means	2	8	24	40	56	65	68	66	55	42	26	12	39
SOUTH DAKOTA.													
Deadwood	20	22	31	39	50	60	65	64	54	44	32	24	42
Huron	7	13	28	44	57	67	70	68	58	46	29	15	42
Sully, Fort	8	15	29	45	59	68	73	68	57	46	30	18	43
Yankton	13	18	30	46	60	69	73	71	62	50	33	20	45
Means	12	17	30	44	56	66	70	68	58	46	31	19	43
MINNESOTA.													
Moorhead	1	5	19	39	55	65	68	65	55	42	24	8	37
St. Vincent	7	0	14	35	53	63	65	62	53	40	20	5	33

APPENDIX No. 44.

Temperature normals (degrees Fahrenheit), Weather Bureau, 9 years, 1881 to 1889.

[Computed from synchronous observations at 7 a. m. and 11 p. m., from 1881 to 1888, combined with 8 a. m. and 8 p. m. observations for 1889; reducing the former to the latter by applying corrections for diurnal variation.]

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
NORTH DAKOTA.													
Bismarck	- 1	6	22	41	55	66	70	68	56	42	25	14	39
Buford, Fort	- 1	6	24	42	53	65	68	66	53	40	24	12	38
Means	- 1	6	23	42	54	66	69	67	54	41	24	13	38
SOUTH DAKOTA.													
Deadwood	16	21	31	42	51	62	67	65	56	44	32	26	43
Huron	6	11	26	43	56	66	70	67	56	44	27	16	41
Sully, Fort	6	14	28	46	56	68	73	70	58	44	28	18	42
Yankton	10	16	29	46	58	70	74	72	60	48	32	21	45
Means	10	16	28	44	55	66	71	68	58	45	30	20	43
MINNESOTA.													
Moorhead	- 4	2	19	40	54	65	68	65	54	41	23	10	36
St. Vincent	-10	- 2	14	35	52	64	66	62	50	38	20	6	33

APPENDIX No. 45.

Monthly and annual mean temperatures from certain selected stations.

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.	Years of record.
Assinaboine, Fort, Mont	7	14	30	44	53	63	68	66	55	43	29	19	41	9
Custer, Fort, Mont	14	21	34	46	55	65	72	70	59	47	32	23	41	9
Duluth, Minn.	6	12	22	38	49	58	66	64	56	45	29	17	38	9
Dubuque, Iowa	15	22	32	49	61	69	74	71	63	51	36	24	47	9
Fetterman, Fort, Wyo	24	28	33	43	55	67	74	70	58	45	33	24	46	13
Helena, Mont	15	23	34	43	50	60	67	66	57	44	30	24	43	9
La Crosse, Wis.	12	19	29	47	60	69	73	70	62	50	35	23	46	9
Maginnis, Fort, Mont	15	20	30	41	50	59	66	64	54	43	34	25	42	6
Poplar River, Mont	- 5	3	24	43	55	66	69	65	56	43	26	8	39	5
St. Paul, Minn.	8	16	27	46	59	68	72	70	60	48	31	18	43	9
Washakie, Fort, Wyo	14	22	33	43	52	63	70	69	57	43	26	24	43	12
CANADIAN STATIONS.														
Calgary	12	14	28	38	49	56	60	58	50	41	29	16	38	6
Edmonton	- 2	7	25	40	50	56	60	58	49	40	21	10	35	7
Medicine Hat	3	10	28	44	54	62	66	64	55	44	29	16	40	7
Minnedosa	-11	- 6	12	34	48	58	62	58	49	36	20	2	30	7
Qu'Appelle	- 8	- 2	16	37	50	60	62	61	50	38	21	5	32	7
Swift Current	- 2	8	24	42	50	60	65	63	53	42	26	12	37	5
Winnipeg	- 8	- 2	12	35	52	62	66	64	52	38	18	3	33	17
Churchill, Fort	-26	-18	-11	11	25	40	56	52	40	24	7	-13	16	3
York Factory	-22	-17	- 7	17	35	52	62	54	42	28	6	-13	20	9

APPENDIX No. 46.

Mean annual temperatures, with annual and mean annual deviations, in degrees Fahrenheit.

[The mean annual deviation is obtained by dividing half the sum of the excesses and deficiencies, neglecting the algebraic signs, by the mean annual temperature.]

Stations.	Mean annual.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.
NORTH DAKOTA.										
Abercrombie, Fort.....	40					±0	±0	+1	+2	+2
Abraham Lincoln, Fort.....	40									
Bismarck.....	40									
Buford, Fort.....	39									
Pembina, Fort.....	35									
Rice, Fort.....	42									
Stevenson, Fort.....	39									
Totten, Fort.....	36									
Yates, Fort.....	43									
SOUTH DAKOTA.										
Bennett, Fort.....	44									
Deadwood.....	42									
Hale, Fort.....	45									
Huron.....	42									
Kimball.....	43									
Meade, Fort.....	45									
Randall, Fort.....	47	-3	±0	±0	+2	+1	-1	+1	+3	
Rapid City.....	46									
Sisseton, Fort.....	38									
Sully, Fort.....	45									
Webster.....	43									
Yankton.....	46				+4					
MINNESOTA.										
Moorhead.....	37									
St. Vincent.....	34									
NEBRASKA.										
Hay Springs.....	44									
Robinson, Fort.....	47									
Valentine.....	46									
Annual sums.....	42	-3			+6	+1	-1	+2	+5	+2
Annual sums North Dakota...	39					±0	±0	+1	+2	+2
Annual sums South Dakota...	44	-3	±0	±0	+6	+1	-1	+1	+3	

Mean annual temperatures, with annual and mean annual deviations, etc.—Continued.

Stations.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.
NORTH DAKOTA.										
Abercrombie, Fort.....		±0	±0		+ 3	±0	—1	— 2	+ 1	— 2
Abraham Lincoln, Fort.....									+ 3	— 3
Bismarck.....										— 5
Buford, Fort.....			+3	+2	+ 2	±0	—1	— 3	± 0	— 3
Pembina, Fort.....							—1	— 2	± 0	— 5
Rice, Fort.....				+1	+ 1	—1	—2	± 0	+ 2	— 3
Stevenson, Fort.....			+2		+ 2	± 0	—1	— 2	± 0	— 5
Totten, Fort.....					+ 4	± 0	—1	— 2	± 0	— 4
Yates, Fort.....										
SOUTH DAKOTA.										
Bennett, Fort.....										
Deadwood.....										
Hale, Fort.....										
Huron.....										
Kimball.....										
Meade, Fort.....										
Randall, Fort.....		—1	±0	+1	+ 3	+2	+1	± 0	+ 2	— 4
Rapid City.....										
Sisseton, Fort.....				+1	+ 3	+1	±0	— 1	+ 2	— 3
Sully, Fort.....				±0	+ 4	+4	±0	— 1	+ 2	— 4
Webster.....										
Yankton.....									+ 1	— 5
MINNESOTA.										
Moorhead.....										
St. Vincent.....										
NEBRASKA.										
Hay Springs.....										
Robinson, Fort.....										
Valentine.....										
Annual sums.....		—1	+5	+5	+22	+6	—6	—13	+13	—46
Annual sums North Dakota.....		±0	+5	+3	+12	—1	—7	—11	+ 6	—30
Annual sums South Dakota.....		—1	±0	+2	+10	+7	+1	— 2	+ 7	—16

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Mean annual temperatures, with annual and mean annual deviations, etc.—Continued.

Stations.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
NORTH DAKOTA.									
Abercrombie, Fort.....	— 3								
Abraham Lincoln, Fort.....	± 0	+ 4	+ 6			± 0	± 0	— 2	— 2
Bismarck.....	— 3	+ 2	+ 5	± 0	— 2	± 0	+ 1	— 2	— 2
Buford, Fort.....	— 2	+ 5		± 0	— 2	± 0	+ 2	— 3	— 2
Pembina, Fort.....	— 3	+ 2	+ 6	— 2	— 2	± 0			
Rice, Fort.....	± 0	+ 5							
Stevenson, Fort.....	± 3			— 1		± 0	+ 1		± 0
Totten, Fort.....	— 2	+ 4	+ 8	+ 1		+ 1	+ 2	— 2	— 3
Yates, Fort.....							± 0	— 1	
SOUTH DAKOTA.									
Bennett, Fort.....						± 0	+ 2	— 2	— 2
Deadwood.....					— 1		+ 1	— 2	— 2
Hale, Fort.....				+ 1	± 0	— 1	+ 2	— 3	
Huron.....							+ 2	— 1	— 1
Kimball.....									
Meade, Fort.....						+ 1	± 0	± 0	— 4
Randall, Fort.....	— 1	+ 1	+ 3	+ 1	± 0	— 1	+ 1	— 2	— 2
Rapid City.....							+ 1		
Sisseton, Fort.....		+ 1	+ 4	+ 1	± 0		+ 2	— 1	— 1
Sully, Fort.....						— 3	+ 3	— 1	— 1
Webster.....								— 1	— 2
Yankton.....	— 2	+ 1	+ 2	+ 1	+ 1	— 1	+ 1	— 2	— 1
MINNESOTA.									
Moorhead.....						+ 1	+ 2	— 3	— 1
St. Vincent.....						+ 2	± 0	— 4	— 1
NEBRASKA.									
Hay Springs.....									
Robinson, Fort.....									
Valentine.....									
Annual sums.....	— 19	+ 25	+ 34	+ 2	— 6	± 0	+ 23	— 32	— 27
Annual sums North Dakota.....	— 16	+ 22	+ 25	— 2	— 6	+ 1	+ 6	— 10	— 9
Annual sums South Dakota.....	— 3	+ 3	+ 9	+ 4	± 0	— 5	+ 15	— 15	— 16

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Mean annual temperatures, with annual and mean annual deviations, etc.—Continued.

Stations.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	Absolute variation.	Mean variation.
NORTH DAKOTA.									
Abercrombie, Fort.....								±0	<i>Per cent.</i> .02
Abraham Lincoln, Fort.....	±0	±0	— 3		+ 2	+ 1		±0.5	.03
Bismarck.....	±0	±0	— 2	— 1	+ 3	+ 1	+ 1	—0.2	.04
Buford, Fort.....	+1	+1	— 1	— 1	+ 4	+ 1	+ 2	+0.3	.04
Pembina, Fort.....	±0	±0	— 1		+ 3	+ 1	+ 9	+0.9	.05
Rice, Fort.....								+0.3	.03
Stevenson, Fort.....								—0.7	.03
Totten, Fort.....	—1	±0	— 2	— 1	+ 5			+1.0	.05
Yates, Fort.....	±0	±0	— 1	— 2	+ 3	+ 1	+ 1	—0.2	.02
SOUTH DAKOTA.									
Bennett, Fort.....					+ 2	+ 2		+0.2	.03
Deadwood.....	+1	+2	+ 1					—0.4	.03
Hale, Fort.....								—0.3	.05
Huron.....	±0	±0	— 1	— 1	+ 2	+ 1	+ 1	+0.3	.02
Kimball.....					±0	— 1	+ 1	±0.0	.01
Meade, Fort.....	±0	+1	±0		+ 1	+ 1	+ 1	—0.2	.02
Randall, Fort.....	±0	+1	±0	— 1	+ 2	+ 2	±0	+0.2	.02
Rapid City.....			— 2		+ 1	+ 1	±0	—0.2	.02
Sisseton, Fort.....	±0	+2	±0	±0				+0.4	.02
Sully, Fort.....	+1	±0	— 1	— 1	+ 2	+ 1	+ 1	+0.5	.03
Webster.....	±0	±0	— 4	— 2	+ 1	+ 1		—1.0	.02
Yankton.....	—1	—1	— 1	— 1	+ 2	+ 1	±0	—0.1	.03
MINNESOTA.									
Moorhead.....	±0	+1	±0	±0	+ 3	+ 2	+ 2	+0.4	.03
St. Vincent.....	±0	+1	±1	±1	+ 3	+ 1	+ 2	+0.1	.04
NEBRASKA.									
Hay Springs.....		±0	— 1	±0	+ 1	+ 1	— 1	±0	.01
Robinson, Fort.....	+1	+1	±0	±0	+ 2			+0.5	.01
Valentine.....		—1	— 1	— 1	+ 3	+ 1	±0	+0.6	.02
Annual sums.....	+2	+8	—19	—15	+45	+19	+20	+2.9	.03
Annual sums North Dakota.....	±0	+1	—10	— 5	+20	+ 5	+13	+1.9	.03
Annual sums South Dakota.....	+1	+5	— 6	— 8	+13	+ 9	+ 4	—0.6	.02

APPENDIX No. 47.

Maximum and minimum and mean annual ranges of temperature.

States and stations.	Temperature ranges.			Length of record.
	Highest.	Lowest.	Mean annual.	
NORTH DAKOTA.				
Bismarck	141	120	132	1875-1891
Buford, Fort	154	116	141	1867-1891
Pembina, Fort	151	122	137	1872-1891
Richardton	146	127	135	1884-1887
Totten, Fort	148	120	133	1870-1890
Yates, Fort	151	128	138	1882-1891
SOUTH DAKOTA.				
Deadwood	124	106	116	1879-1887
Huron	142	114	131	1882-1891
Olivet	136	118	126	1878-1882
Randall, Fort	145	103	129	1860-1891
Rapid City	130	117	124	1888-1891
Sisseton, Fort	144	112	126	1869-1888
Sully, Fort	144	110	132	1869-1891
Webster	146	128	138	1883-1891
Yankton	133	108	119	1874-1891
MINNESOTA.				
Moorhead	145	127	134	1881-1891
St. Vincent	146	132	138	1881-1890
NEBRASKA.				
Robinson, Fort	140	115	127	1884-1891
Valentine	138	121	128	1886-1891
SELECTED STATIONS.				
Assinnaboine, Fort, Mont.	157	120	137	1881-1891
Duluth, Minn.	135	110	120	1873-1891
Helena, Mont.	140	108	122	1881-1891
McKinney, Fort, Wyo.	131	109	118	1888-1891
Poplar River, Mont.	159	146	155	1884-1888
St. Paul, Minn.	135	109	123	1873-1891
Washakie, Fort, Wyo.	141	114	124	1888-1890
CANADIAN STATIONS.				
Calgary	134	116	125	1885-1890
Churchill, Fort	124	119	121	1885-1887
Edmonton	144	135	140	1883-1886
Medicine Hat	158	130	143	1884-1890
Minnedosa	155	134	141	1883-1890
Qu'Appelle	141	130	137	1883-1890
Regina	156	143	148	1885-1889
Swift Current	146	121	133	1886-1890
Winnipeg	148	129	138	1883-1890

APPENDIX No. 48.

Average monthly absolute ranges of temperature.

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.	Length of record.
Fort Buford, N. Dak...	80	79	75	67	64	56	53	59	62	64	70	73	67	1879-1891
Bismarck, N. Dak....	73	73	70	64	58	53	50	55	61	61	68	69	63	1875-1891
Ft. Stevenson, N. Dak.	71	74	66	69	55	54	50	53	59	62	70	62	62	1879-1882
St. Vincent, Minn....	75	75	68	74	61	56	49	57	60	59	68	71	64	1881-1891
Fort Totten, N. Dak...	73	73	59	70	57	53	47	52	59	59	68	66	61	July 1880-Dec. 1890
Fort Yates, N. Dak....	77	78	72	68	60	59	51	59	65	71	67	66	66	1883-1891
Moorhead, Minn.....	73	75	65	69	61	55	48	56	61	58	68	66	63	1881-1891
Fort Bennett, S. Dak.	75	79	74	65	60	56	54	59	62	64	67	73	66	{Sept. 1880-Nov. 1885 Feb. 1889-Oct. 1891
Deadwood, S. Dak....	70	73	61	53	50	50	47	50	52	58	62	67	58	1878-1887
Huron, S. Dak.....	73	76	71	64	58	54	50	53	62	61	70	71	63	July 1881-1891
Fort Meade, S. Dak...	76	86	71	64	62	54	52	58	59	63	73	75	66	Jan. 1883-Dec. 1891
Fort Sully, S. Dak....	72	78	73	64	60	54	54	58	64	66	70	69	65	Jan. 1883-June 1891
Yankton, S. Dak.....	70	71	70	64	55	49	45	48	57	62	67	68	60	Apr. 1873-1891
Rapid City, S. Dak...	73	77	73	66	58	53	48	53	60	57	68	67	66	1888-1891
Ft. Pembina, N. Dak...	73	72	69	72	62	57	51	56	62	66	73	71	65	Nov. 1872-Dec. 1891
Fort Randall, S. Dak.	78	78	75	68	60	55	53	57	67	69	76	76	68	Jan. 1872-Dec. 1891
Valentine, Nebr.....	78	78	78	68	61	51	51	56	62	65	76	73	66	Sept. 1885-Dec. 1891
Webster, S. Dak.....	74	83	79	69	61	53	50	57	68	67	79	77	68	June 1882-Dec. 1891
Fort Robinson, Nebr..	72	81	71	64	65	53	56	59	60	66	76	71	66	1884-1891
Means	74	77	71	66	59	54	50	56	61	63	70	71	64	

APPENDIX No. 49.

Monthly and annual mean daily temperature ranges.

Bismarck, N. Dak....	22	22	20	23	23	23	23	25	25	22	21	20	22	1877-1891
Fort Buford, N. Dak.	23	23	22	24	26	25	27	29	29	24	22	21	25	1879-1891
Deadwood, S. Dak....	23	21	20	19	20	21	21	22	22	20	20	18	21	1878-1887
Huron, S. Dak.....	23	22	20	25	25	24	24	25	26	25	23	21	24	July 1881-Dec. 1891
Moorhead, Minn.....	21	22	20	22	25	23	23	24	24	21	19	19	22	1881-1891
St. Vincent, Minn....	21	22	23	22	25	24	24	25	25	21	18	20	22	1877-1891
Yankton, S. Dak.....	21	21	21	23	21	21	21	22	24	23	21	19	22	1877-1891
Fort Bennett, S. Dak.	26	25	24	24	24	24	24	26	26	26	25	23	25	Oct. 1880-Nov. 1885
Rapid City, S. Dak...	22	22	22	24	22	22	22	25	27	24	24	23	23	1888-1891
Ft. Stevenson, N. Dak.	20	21	21	22	23	24	24	25	25	22	18	18	22	Feb. 1879-May 1883
Fort Sully, S. Dak....	20	20	21	24	25	24	27	26	27	26	24	21	24	{Jan. -Oct. 1877 Apr. 1885-June 1891
Valentine, Nebr.....	25	25	24	25	24	23	26	25	27	27	26	25	25	Sept. 1885-Dec. 1891
Means	22	22	22	23	24	23	24	25	26	23	22	21	23	

APPENDIX No. 50.

Greatest daily ranges of temperature, with monthly and annual averages, in North Dakota.

BISMARCK, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	43	39	34	39	34	32	33	36	48	40	25	47	38
1886	42	51	40	33	39	36	35	37	40	43	44	48	41
1887	57	47	35	37	43	34	37	40	39	36	43	36	40
1888	37	49	42	44	37	36	30	40	45	46	38	40	40
1889	48	49	41	40	42	37	38	50	42	51	45	39	44
1890	46	51	42	45	45	31	45	45	45	35	41	41	43
1891	46	54	54	40	38	37	32	39	45	46	38	28	41
Means	46	49	41	40	40	35	36	41	43	42	39	40	41

BUFORD, FORT, N. DAK.

1885	41	32	35	42	43	35	40	37	47	44	27	36	38
1886	48	41	43	38	39	38	38	40	43	45	42	47	42
1887	51	53	39	41	44	32	43	37	39	41	39	42	42
1888		55	44	43	36	40	40	40	43	42	36	34	
1889	48	38	41	42	37	49	48	51	48	51	43	40	45
1890	53	40	48	44	43	37	47	43	46	38	40	33	43
1891	43	43	43	42	47	38	31	41	43	39	35	37	40
Means	47	43	42	42	41	38	41	41	44	43	37	38	41

TOTTEN, FORT, N. DAK.

1885	43	31		40	36	35	32	35	51	39	24	44	
1886	36	49	39	33	38	38	38	39	41	43	34	46	40
1887	51	35	39	44	40	32	34	27	39	33	35	50	38
1888	30	40	33	33	35	38	31	42	44	38	40	36	36
1889	43												
Means	41	39	37	38	37	35	34	36	44	38	33	44	38

YATES, FORT, N. DAK.

1887				40	45	41	39	41	47	40	47	31	
1888	45	44	42	44	38	39	41	43	49	49	38	45	43
1889					50	42	39	45	45	46	48	40	
Means				42	44	41	40	43	47	45	44	39	

Greatest daily ranges of temperature, with monthly and annual averages, in South Dakota.

DEADWOOD, S. DAK.

1885	31	33	25	31	31	30	32	32	34	35	34	31	32
1886	55	28	29	30	34	31	32	32	32	30	35	39	34
1887	36	49		30	36	29	33	36	35	35	35	40	
Means	41	37	27	30	34	30	32	33	34	33	35	37	34

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Greatest daily ranges of temperature, with monthly and annual averages, in South Dakota—Continued.

HURON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	39	36	39	46	42	32	33	36	40	46	30	44	39
1886	47	47	43	45	48	37	40	43	44	49	41	44	44
1887	46	43	35	45	45	35	38	33	40	47	44	54	42
1888	41	43	41	47	38	36	37	41	52	52	43	37	42
1889	46	47	44	49	39	48	34	43	48	44	48	50	46
1890	40	35	32	51	43	35	41	45	49	51	48	42	43
1891	53	43	39	45	42	35	33	43	50	47	40	34	42
Means	45	42	39	47	42	37	38	41	46	48	42	44	43

PIERRE, S. DAK.

1891							38	39	49	47	42	31	
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RAPID CITY, S. DAK.

1888	48	56	43	44	36	34	39	34	43	48	41	40	42
1889	40	37	52	40	39	41	50	41	40	41	44	41	42
1890	48	46	39	40	40	34	38	46	45	40	48	37	42
1891	37	45	41	43	39	36	36	39	48	44	42	39	41
Means	43	46	44	42	38	36	41	40	44	43	44	40	42

SULLY, FORT, S. DAK.

1887						32	35	36	38	43	44	38	.....
1888	49	50	46	44	38	38	38	39	46	47	44	39	43
1889	41	45	41	38	37	42	46	44	46	45	43	38	42
1890	41	49	42	46	47	39	39	40	48	49	45	40	44
1891	49	46	37	41	43	32							.....
Means	45	48	42	42	41	37	40	40	44	46	44	39	42

YANKTON, S. DAK.

1885	33	32	40	42	41	27	29	28	41	43	35	40	36
1886	40	44	33	35	38	32	38	34	39	46	37	38	38
1887	44	30	42	43	39	35	32	35	32	40	42	53	39
1888	41	45	35	42	32	29	32	31	50	48	48	37	39
1889	43	44	40	44	39	38	38	33	45	42	42	38	40
1890	44	38	35	43	36	29	32	36	44	47	45	45	40
1891	46	40	33	.....	45	36	33	29	36	44	35	33	.....
Means	42	39	37	42	39	32	33	32	41	44	41	41	39

Greatest daily ranges of temperature, with monthly and annual averages, in Minnesota.

MOORHEAD, MINN.

1885	35	32	39	38	31	35	31	43	41	45	29	35	36
1886	41	53	35	36	38	.....	34	42	42	48	42	37	.....
1887	51	36	30	49	48	37	36	35	40	44	40	52	42
1888	40	35	31	32	40	43	35	40	46	49	36	43	39
1889	40	41	36	50	44	40	40	42	46	44	42	34	42
1890	51	40	33	51	42	33	41	42	44	34	40	36	41
1891	41	42	41	51	46	34	33	39	44	37	40	32	40
Means	43	40	35	44	42	37	36	40	43	43	38	38	40

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Greatest daily ranges of temperature, with monthly and annual averages, in Minnesota—Continued.

ST. VINCENT, MINN.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	40	36	39	43	34	35	31	41	40	35	25	39	36
1886	48	37	35	37	41	44	40	44	44	46	34	37	41
1887	42	31	38	38	49	45	40	40	51	47	42	38	42
1888	46	43	38	32	43	46	35	43	54	42	40	37	42
1889	34	36	37	45	47	43	45	45	48	39	37	45	42
1890	48	49	40	45	44	43	39	45	41	33	35	36	42
1891	38	46	38	50	52	32	38	36	47	35	40	36	41
Means	42	40	38	41	44	41	38	42	46	40	36	38	40

Greatest daily ranges of temperature, with monthly and annual averages, in Iowa.

SIOUX CITY, IOWA.

1889							22	30	46	38	33	34	.....
1890	41	35	37	44	40	29	34	34	38	41	46	38	38
1891	45	42	28	35	33	31	32	29	43	46	29	34	36
Means	43	38	32	40	36	30	29	31	42	42	36	35	36

Greatest daily ranges of temperature, with monthly and annual averages, in Nebraska.

VALENTINE, NEBR.

1886	50	37	43	38	36	31	40	40	46	41	36	40	40
1887	44	49	37	46	42	40	55	58	36	44	54	36	45
1888	48	66	47	48	38	44	42	36	48	47	.....	48	.....
1889	54	53	56	49	42	41	43	41	53	48	43	44	47
1890	42	42	39	42	46	34	42	40	46	46	52	43	43
1891	43	40	49	45	38	33	29	38	43	47	38	39	40
Means	47	48	45	45	40	37	42	42	45	46	45	42	44

APPENDIX No. 51.

Least daily ranges of temperature, with monthly and annual averages, in North Dakota.

BISMARCK, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	9	7	7	4	12	10	10	6	11	6	7	10	8
1886	11	8	8	11	9	11	14	13	14	8	11	7	10
1887	8	9	5	9	13	18	11	9	13	6	12	8	10
1888	9	10	3	7	3	7	11	7	12	4	3	1	6
1889	4	3	5	13	5	15	11	13	4	7	5	5	8
1890	5	5	2	9	8	9	12	18	6	5	6	6	8
1891	8	4	5	3	11	4	8	10	9	4	2	6	6
Means	8	7	5	8	9	11	11	11	10	6	7	6	8

BUFORD, FORT, N. DAK.

1885	11	10	10	9	16	11	17	8	14	11	4	8	11
1886	8	11	7	9	11	11	15	10	14	6	7	6	10
1887	7	5	4	8	10	16	9	8	9	6	12	8	8
1888		10	11	7	7	7	14	10	9	3	6	5	
1889	11	6	5	8	1	15	17	8	10	12	8	5	9
1890	7	6	5	6	5	8	13	14	5	4	8	6	7
1891	7	3	5	6	11	3	10	16	6	6	4	2	7
Means	8	7	7	8	9	10	14	11	10	7	7	6	9

TOTTEN, FORT, N. DAK.

1885	10	4		3	9	12	12	8	7	6	3	8	
1886	9	10	7	7	9	11	14	13	8	6	5	7	9
1887	13	9	9	4	6	12	4	6	8	7	10	8	8
1888	5	10	6	11	8	8	14	6	3	3	5	2	7
1889	7												
Means	9	8	7	6	8	11	11	8	6	6	6	6	8

YATES, FORT, N. DAK.

1887				11	15	8	12	12	4	20	9	7	
1888	4	6	6	7	7	7	12	10	21	10	8	6	9
1889					3	20	16	21	12	10	10	11	
Means				9	8	12	13	14	12	13	9	8	

Least daily ranges of temperature, with monthly and annual averages, in South Dakota.

DEADWOOD, S. DAK.

1885	6	8	4	8	9	8	10	9	6	10	11	9	8
1886	4	6	4	5	7	7	12	7	10	7	10	3	7
1887	7	8		6	5	13	7	5	8	9	8	6	
Means	6	7	4	6	7	9	10	7	8	9	10	6	7

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Least daily ranges of temperature, with monthly and annual averages, in South Dakota—Continued.

HURON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	7	9	8	0	7	10	10	7	6	12	4	7	7
1886	10	8	6	9	15	17	12	14	12	10	5	4	10
1887	11	5	7	9	12	7	8	9	14	6	8	9	9
1888	9	7	7	11	6	6	14	5	10	6	7	2	8
1889	5	6	7	4	7	15	6	10	6	7	5	5	7
1890	4	5	9	10	6	7	12	8	15	5	7	7	8
1891	3	5	3	10	4	4	14	16	14	4	4	5	7
Means	7	6	7	8	8	9	11	10	11	7	6	6	8

PIERRE, S. DAK.

1891							11	10	5	9	7	5	
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RAPID CITY, S. DAK.

1888	11	9	10	14	7	5	10	4	7	3	7	6	8
1889	7	3	7	4	6	7	7	10	5	8	8	5	6
1890	5	9	6	6	9	5	13	8	8	10	2	7	7
1891	4	5	4	2	2	9	10	10	10	4	10	7	6
Means	7	6	7	6	6	6	10	8	8	6	7	6	7

SULLY, FORT, S. DAK.

1887						13	13	5	11	5	8	6	
1888	7	4	4	11	7	8	14	5	7	8	6	3	7
1889	2	2	3	5	5	13	10	12	5	3	6	1	6
1890	5	4	10	6	9	9	12	10	6	3	5	6	7
1891	7	4	4	3	6	3							
Means	6	4	5	6	7	9	12	8	7	5	6	4	7

YANKTON, S. DAK.

1885	2	6	9	12	10	12	8	5	3	7	7	7	7
1886	8	5	5	10	11	12	14	12	7	13	3	5	9
1887	8	6	5	5	10	9	10	4	7	8	11	4	7
1888	6	5	6	5	3	8	11	9	12	7	4	3	7
1889	5	4	7	6	14	12	3	10	4	7	5	5	7
1890	5	5	3	12	3	7	4	6	10	3	7	6	6
1891	4	4	2		7	3	11	14	8	5	5	7	
Means	5	5	5	8	8	9	9	9	7	7	6	5	7

Least daily ranges of temperature, with monthly and annual averages, in Minnesota.

MOORHEAD, MINN.

1885	11	9	9	6	5	12	15	4	15	5	4	9	9
1886	5	7	7	6	6		15	13	13	8	6	7	
1887	5	6	7	3	11	13	13	7	11	3	6	4	7
1888	6	6	7	4	9	10	10	8	5	5	3	3	6
1889	2	3	4	9	5	13	13	12	5	2	4	5	6
1890	5	5	5	13	8	7	8	7	8	5	5	6	7
1891	7	7	5	4	10	5	9	11	4	2	3	4	6
Means	6	6	6	6	8	10	12	9	9	4	4	5	7

Least daily ranges of temperature, with monthly and annual averages, in Minnesota—Continued.

ST. VINCENT, MINN.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	12	5	10	5	8	12	10	14	13	7	4	9	9
1886	6	9	8	6	11	12	14	12	12	6	4	4	9
1887	7	9	7	7	6	12	7	7	15	9	12	10	9
1888	9	6	8	7	7	8	12	8	8	3	4	4	7
1889	7	2	5	6	5	11	7	9	4	6	3	7	6
1890	2	5	3	6	6	4	10	10	5	5	5	5	6
1891	7	7	11	4	7	6	5	13	8	5	4	5	7
Means	7	6	7	6	7	9	9	10	9	6	5	6	7

Least daily ranges of temperature, with monthly and annual averages, in Iowa.

SIOUX CITY, IOWA.

1889							4	10	8	7	6	5	-----
1890	6	7	5	10	5	8	7	10	9	4	7	4	7
1891	5	6	5	10	5	4	10	14	8	3	4	6	7
Means	6	6	5	10	5	6	7	11	8	5	6	5	7

Least daily ranges of temperature, with monthly and annual averages, in Nebraska.

VALENTINE, NEBR.

1886	8	9	5	7	14	8	15	14	8	10	7	8	9
1887	12	12	8	3	8	13	13	7	10	7	10	8	9
1888	8	7	9	11	7	11	13	6	11	9	-----	9	-----
1889	6	6	11	5	7	8	8	11	5	4	5	6	7
1890	4	6	2	9	6	12	10	10	10	11	10	8	8
1891	4	6	3	5	6	7	11	5	10	8	9	6	7
Means	7	8	6	7	8	10	12	9	9	8	8	8	8

APPENDIX No. 52.

Monthly and annual mean maximum temperatures.

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.	Length of record.
Bismarck, N. Dak.	15	20	33	54	67	76	81	80	70	56	39	25	51	1880-1891
Fort Buford, N. Dak. .	14	20	35	56	67	77	82	81	70	55	37	25	52	1880-1891
Moorhead, Minn.	9	15	29	52	66	76	79	77	68	54	35	22	48	1881-1891
St. Vincent, Minn.	4	10	26	49	64	75	77	75	66	51	31	17	45	Sept. 1880-Dec. 1891
Huron, S. Dak.	18	23	38	59	68	79	83	81	73	59	42	30	54	July 1881-Dec. 1891
Fort Sully, S. Dak. ...	19	24	40	60	69	80	87	84	75	68	46	32	57	1885-1891
Yankton, S. Dak.	24	29	40	60	71	81	85	83	75	62	45	34	57	1880-1891
Rapid City, S. Dak. ...	31	32	42	60	64	75	83	82	75	61	48	45	58	1888-1891
Valentine, Nebr.	26	36	46	62	63	75	87	83	75	62	49	41	59	1886-1890
Fort Yates, N. Dak. ..	15	21	37	61	70	81	84	82	74	59	44	29	55	1883-1891
Deadwood, S. Dak.	29	32	43	48	59	70	76	75	65	55	45	33	52	1882-1887
Means	17	24	37	56	65	77	82	80	71	58	42	30	53	

APPENDIX No. 53.

Monthly and annual mean daily variability of temperature.

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.	Length of record.
Fort Buford, N. Dak. ..	9	9	7	6	5	4	4	4	5	5	6	8	6	1881-1891
Bismarck, N. Dak.	9	9	7	6	5	4	4	5	6	6	6	8	6	1881-1891
St. Vincent, Minn.	9	10	8	6	6	5	4	5	5	6	6	9	7	1881-1891
Fort Totten, N. Dak. ...	8	10	8	6	5	5	4	4	5	6	6	8	6	June 1884-Jan. 1889
Moorhead, Minn.	10	10	7	6	6	4	4	4	6	6	6	8	6	Dec. 1881-1891
Huron, S. Dak.	9	9	7	6	5	4	4	4	6	6	7	7	6	July 1881-1891
Fort Sully, S. Dak.	8	9	7	6	6	5	5	5	6	6	6	7	6	Dec. 1885-June 1891.
Yankton, S. Dak.	9	9	7	6	5	4	4	4	5	5	7	7	6	1881-1891
Means	9	9	7	6	5	4	4	4	6	6	6	8	6	

NOTE.—The variability of temperature is expressed by the change in the daily mean temperature from day to day independent of whether the temperature rises or falls.

APPENDIX No. 54.

Seasonal temperature normals—quarterly values—records for many years.

Stations.	First quarter.			Second quarter.			Third quarter.			Fourth quarter.			Annual.
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
NORTH DAKOTA.													
Abercrombie, Fort.....		9			56			67			27		40
Abraham Lincoln, Fort.....		11			54			66			29		40
Bismarck.....		12			54			64			28		40
Buford, Fort.....		12			54			64			27		39
Davenport.....		12			55			64			30		40
Gallatin.....		8			50			62			28		37
New England City.....		14			53			64			29		40
Pembina, Fort.....		4			51			62			22		35
Ransom, Fort.....		11			56			65			25		39
Rice, Fort.....		17			56			68			29		42
Richardton.....		10			51			64			28		38
Seward, Fort.....		7			52			65			24		37
Stevenson, Fort.....		11			54			65			25		39
Totten, Fort.....		7			52			63			24		36
Yates, Fort.....		14			57			68			32		43
Means.....		11			54			65			27		39
SOUTH DAKOTA.													
Alexandria.....		9			56			67			27		43
Bennett, Fort.....		19			57			68			32		44
Brookings.....		16			55			65			32		42
Deadwood.....		25			50			61			33		42
Hale, Fort.....		19			59			69			32		45
Huron.....		15			56			66			32		42
Kimball.....		16			57			66			33		43
Meade, Fort.....		23			54			67			35		45
Olivet.....		23			58			69			31		45
Parkston.....		18			57			67			36		44
Randall, Fort.....		23			60			71			35		47
Rapid City.....		25			54			68			38		46
Sisseton, Fort.....		10			53			65			26		38
Sully, Fort.....		20			58			70			33		45
Vermillion.....		19			60			69			38		46
Webster.....		13			57			68			32		43
Woonsocket.....		16			57			67			32		44
Yankton.....		22			55			69			35		46
Means.....		18			56			67			33		44
IOWA, MINNESOTA, AND NEBRASKA.													
Sioux City, Iowa.....		25			59			69			36		47
Moorhead, Minn.....		7			53			63			27		37
St. Vincent, Minn.....		3			51			60			23		34
Hay Springs, Nebr.....		22			54			66			34		44
Fort Robinson, Nebr.....		26			57			68			38		47
Valentine, Nebr.....		23			57			68			37		46

APPENDIX No. 55.

Seasonal temperature normals—records for many years.

Stations.	Dry season.—Winter.				Wet season.—Spring, summer, and autumn.								Annual.
	Jan.	Feb.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	
NORTH DAKOTA.													
Abercrombie, Fort		12							54				40
Abraham Lincoln, Fort.....		13							54				40
Bismarck		14							52				40
Buford, Fort		13							52				39
Davenport		14							53				40
Gallatin		12							50				37
New England City		16							52				40
Pembina		6							49				35
Ransom, Fort		13							52				39
Rice, Fort		17							55				42
Richardton		12							52				38
Seward, Fort		10							51				37
Stevenson, Fort		12							52				39
Totten, Fort		8							50				36
Yates, Fort		16							56				43
Means		13							52				39
SOUTH DAKOTA.													
Alexandria		18							56				43
Bennett, Fort		19							57				44
Brookings		18							54				42
Deadwood		25							51				42
Hale, Fort		18							58				45
Huron		17							55				42
Kimball		19							55				43
Meade, Fort		24							55				45
Olivet		21							59				45
Parkston		22							56				44
Randall, Fort		23							59				47
Rapid City		27							56				46
Sisseton, Fort		12							52				38
Sully, Fort		20							57				45
Vermillion		22							58				46
Webster		16							56				43
Woonsocket		18							55				44
Yankton		22							57				46
Means		20							56				44
IOWA, MINNESOTA, AND NEBRASKA.													
Sioux City, Iowa		25							58				47
Moorhead, Minn.		10							51				37
St. Vincent, Minn.		6							48				34
Hay Springs, Nebr.		23							54				44
Robinson, Fort, Nebr.		28							57				47
Valentine, Nebr.		26							57				46

APPENDIX No. 56.

Seasonal temperature normals—records for many years.

Stations.	Dry season.—Winter, spring, and autumn.							Wet season.—Summer.					Annual.
	Jan.	Feb.	Mar.	Sept.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	
NORTH DAKOTA.													
Abercrombie, Fort				24						62			40
Abraham Lincoln, Fort.....				25						61			40
Bismarck				26						59			40
Buford, Fort				25						60			39
Davenport				26						60			40
Gallatin				23						57			37
New England City				26						59			40
Pembina, Fort				19						57			35
Ransom, Fort.....				24						61			39
Rice, Fort.....				28						63			42
Richardton				24						58			38
Seward, Fort.....				21						59			37
Stevenson, Fort.....				23						60			39
Totten, Fort				21						58			36
Yates, Fort.....				28						63			43
Means				24						60			39
SOUTH DAKOTA.													
Alexandria				28						61			43
Bennett, Fort				31						63			44
Brookings				29						60			42
Deadwood				33						56			42
Hale, Fort				30						65			45
Huron				28						61			42
Kimball				29						62			43
Meade, Fort.....				33						61			45
Meade, Fort.....				32						64			45
Olivet				32						62			44
Parkston				34						66			47
Randall, Fort				36						61			46
Rapid City.....				24						59			38
Sisseton, Fort.....				32						64			45
Sully, Fort.....				33						65			46
Vermillion				28						63			43
Webster				29						62			44
Woonsocket				33						64			46
Yankton				31						62			44
IOWA, MINNESOTA, AND NEBRASKA.													
Sioux City, Iowa.....				35						64			47
Moorhead, Minn.....				22						58			37
St. Vincent, Minn.....				19						56			34
Hay Springs, Nebr.....				32						60			44
Robinson, Fort, Nebr.....				36						63			47
Valentine, Nebr.....				34						63			46

APPENDIX No. 57.

Seasonal temperature normals—records for many years.

Stations.	Dry season.—October to March, inclusive.						Wet season.—April to September, inclusive.						Annual.
	Jan.	Feb.	Mar.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.	
NORTH DAKOTA.													
Abercrombie, Fort				18						62			40
Abraham Lincoln, Fort.....				20						60			40
Bismarck				20						59			40
Buford, Fort.....				20						59			39
Davenport				21						60			40
Gallatin				18						56			37
New England City				22						58			40
Pembina, Fort				13						56			35
Ransom, Fort.....				18						60			39
Rice, Fort				23						62			42
Richardson				19						57			38
Seward, Fort.....				15						58			37
Stevenson, Fort.....				18						60			39
Totten, Fort.....				16						58			36
Yates, Fort.....				23						63			43
Means				19						59			39
SOUTH DAKOTA.													
Alexandria.....				22						62			43
Bennett, Fort.....				26						63			44
Brookings				24						60			42
Deadwood				29						56			42
Hale, Fort.....				25						64			45
Huron				24						61			42
Kimball				24						62			43
Meade, Fort				29						60			45
Olivet				27						64			45
Parkston				27						62			44
Randall, Fort.....				29						65			47
Rapid City.....				31						66			46
Sisseton, Fort.....				18						59			38
Sully, Fort.....				26						64			45
Vermillion				28						64			46
Webster				22						63			43
Woonsocket				24						62			44
Yankton				28						64			46
Means				26						59			44
IOWA, MINNESOTA, AND NEBRASKA.													
Sioux City, Iowa.....				30						64			47
Moorhead, Minn.....				17						58			37
St. Vincent, Minn.....				13						55			34
Hay Spring, Nebr.....				28						60			44
Robinson, Fort, Nebr.....				32						63			47
Valentine, Nebr.....				30						63			46

APPENDIX No. 58.

Excess of temperature (degrees Fahrenheit) as compared with normal values for many years.

WARM PERIODS.

Stations.	February, 1886.	January, 1889.	January, 1891.	Total excess.
Abraham Lincoln, Fort, N. Dak.....	7	10	21	38
Bismarck, Fort, N. Dak.....	6	10	19	35
Buford, Fort, N. Dak.....	7	7	17	31
Pembina, N. Dak.....	1	10	26	35
Yates, Fort, N. Dak.....	9	11	20	40
Huron, S. Dak.....	7	6	17	30
Meade, Fort, S. Dak.....	10	4	13	27
Randall, Fort, S. Dak.....	4	4	12	20
Sully, Fort, S. Dak.....	6	4	15	25
Webster, S. Dak.....	9	7	21	37
Yankton, S. Dak.....	3	6	13	22
Moorhead, Minn.....	4	11	15	30
St. Vincent, Minn.....	6	13	17	36
Sums.....	77	103	226	406

APPENDIX No. 60.

Deficiency of temperature (degrees Fahrenheit) as compared with normal values for many years.

COLD PERIODS.

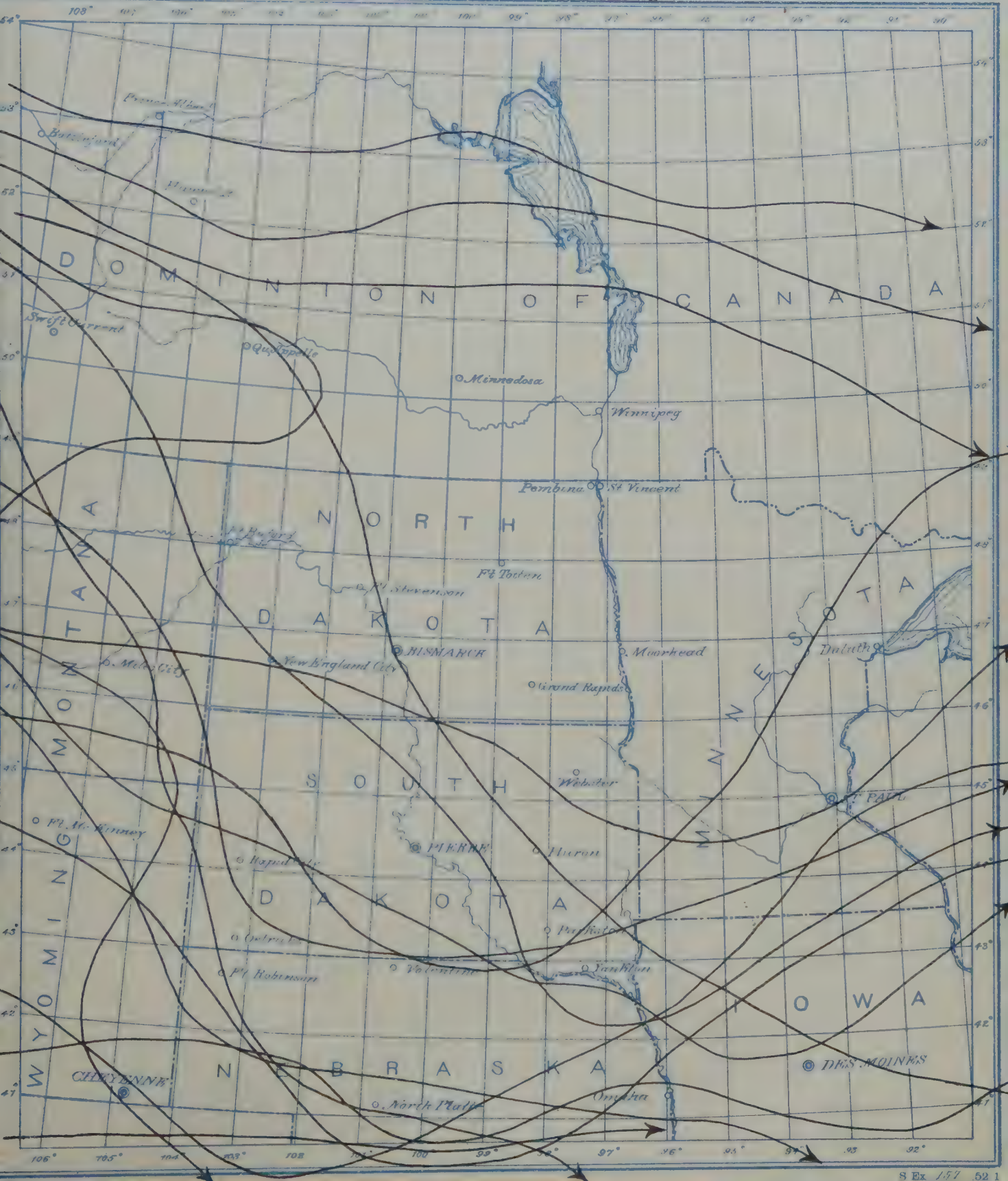
Stations.	January, 1886.	January, 1887.	February, 1887.	Total de- ficiency.
Abraham Lincoln, Fort, N. Dak	10	13	19	42
Bismarek, N. Dak	9	12	14	35
Buford, Fort, N. Dak	9	9	15	33
Pembina, N. Dak	9	10	6	25
Totten, Fort, N. Dak	8	9	11	28
Yates, Fort, N. Dak	8	8	11	27
Deadwood, S. Dak	6	1	8	15
Huron, S. Dak	7	7	8	22
Meade, Fort, S. Dak	11	1	5	17
Randall, Fort, S. Dak	8	6	+ 1	13
Sisseton, Fort, S. Dak	8	9	7	24
Sully, Fort, S. Dak	11	10	16	37
Webster, S. Dak	4	17	8	29
Yankton, S. Dak	9	6	9	24
Moorhead, Minn	6	8	6	20
St. Vincent, Minn	5	7	3	15
Sums	128	133	145	406

Cold Periods. Appendix N: 61.

Tracks of Areas of Low Pressure. (Storm Centers.)

January 1886 and 1887, and February 1887.

Total Deficiency of Temperature 406 Degrees Fahrenheit.



APPENDIX No. 62.

Record of the number of days on which the maximum temperature equaled or exceeded 90° throughout the year.

[Letters prefixed to records indicate the number of days of observations missing, thus the letter *d* shows four days not recorded.]

ABRAHAM LINCOLN, FORT, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1874	0	0	0	1	6	10	15	2	4	0	0	0	38
1875	0	0	0	0	0	0	1	2	0	0	0	0	3
1876	0	0	0	0	0	3	5	3	0	0	0	0	11
1877	0	0	0	0	0	1	4	1	0	0	0	0	6
1878	0	0	0	0	0	0	3	7	2	0	0	0	12
1879	0	0	0	0	0	0	4	2	0	1	0	0	-----
1880	0	0	0	0	2	0	1	0	0	0	0	0	-----
1881	0	0	0	0	0	1	8	6	1	0	0	0	16
1882	0	0	0	0	0	0	0	5	1	0	0	0	6
1883	0	0	0	0	0	4	4	1	2	0	0	0	11
1884	0	0	0	0	0	3	0	5	0	0	0	0	8
1885	0	0	0	0	0	0	3	3	2	0	0	0	8
1886	0	0	0	0	1	3	20	13	1	0	0	0	38
1887	0	0	0	1	1	5	4	1	0	0	0	0	12
1888	0	0	0	0	0	3	3	5	2	0	0	0	13
1889	0	0	0	0	0	4	5	6	2	0	0	0	17
1890	0	0	0	0	0	4	12	8	0	0	0	0	24
Means	0	0	0	0.1	0.6	2	5	4	1	0.1	0	0	14

BISMARCK, N. DAK.

1875	0	0	0	0	0	0	4	1	0	0	0	0	5
1876	0	0	0	0	0	2	4	6	0	0	0	0	12
1877	0	0	0	0	0	0	1	3	1	0	0	0	5
1878	0	0	0	0	0	2	6	6	1	0	0	0	15
1879	0	0	0	0	0	1	2	0	0	0	0	0	3
1880	0	0	0	0	1	0	3	3	0	0	0	0	7
1881	0	0	0	0	0	0	8	5	0	0	0	0	13
1882	0	0	0	0	0	0	0	5	1	0	0	0	6
1883	0	0	0	0	0	4	2	1	2	0	0	0	9
1884	0	0	0	0	0	2	0	2	0	0	0	0	4
1885	0	0	0	0	0	0	2	2	2	0	0	0	6
1886	0	0	0	0	1	1	16	11	1	0	0	0	30
1887	0	0	0	0	2	4	4	1	0	0	0	0	11
1888	0	0	0	0	0	0	0	0	0	0	0	0	0
1889	0	0	0	0	0	3	1	5	1	0	0	0	10
1890	0	0	0	0	0	2	8	4	0	0	0	0	14
1891	0	0	0	0	1	0	0	5	2	0	0	0	8
Means	0	0	0	0	0.3	1	4	4	0.6	0	0	0	10

BUFORD, FORT, N. DAK.

1873	0	0	0	0	0	1	5	6	0	0	0	0	12
1874	0	0	0	0	0	4	14	0	2	0	0	0	20
1875	0	0	0	0	0	0	3	1	0	0	0	0	4
1876	0	0	0	0	0	1	4	4	0	0	0	0	9
1877	0	0	0	0	0	0	0	0	0	0	0	0	0
1878	0	0	0	0	0	0	-----	3	0	0	0	0	-----

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Record of the number of days on which the maximum temperature equaled or exceeded 90° throughout the year—Continued.

BUFORD, FORT, N. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1879	0	0	0	0	0	0	1	0	0	0	0	0	1
1880	0	0	0	0	1	2	5	2	0	0	0	0	10
1881	0	0	0	1	0	2	9	6	0	0	0	0	18
1882	0	0	0	0	0	1	6	18	4	0	0	0	29
1883	0	0	0	0	0	6	6	3	1	0	0	0	16
1884	0	0	0	0	0	12	2	10	0	0	0	0	24
1885	0	0	0	0	0	2	5	1	1	0	0	0	9
1886	0	0	0	0	0	4	17	11	0	0	0	0	32
1887	0	0	0	0	1	3	3	2	0	0	0	0	9
1888	0	0	0	0	0	6	12	9	2	0	0	0	29
1889	0	0	0	0	0	5	5	5	1	0	0	0	16
1890	0	0	0	0	0	0	9	4	1	0	0	0	14
1891	0	0	0	0	0	0	0	3	0	0	0	0	3
Means	0	0	0	0	0.1	3	6	5	0.6	0	0	0	15

DEADWOOD, S. DAK.

1878	0	0	0	0	0						0	0	
1879	0	0	0	0	0	1	1	1	0		0	0	
1880	0	0	0	0	0	1	0	2	0	0	0	0	3
1881	0	0	0	0	0	2	6	4	0	0	0	0	12
1882	0	0	0	0	0	0	0	1	0	0	0	0	1
1883	0	0	0	0	0	0	0	0	0	0	0	0	0
1884	0	0	0	0	0	1	0	0	0	0	0	0	1
1885	0	0	0	0	0	0	0	0	0	0	0	0	0
1886	0	0	0	0	0	0	8	4	0	0	0	0	12
1887	0	0	0	0	0	1	0	0	0	0	0	0	1
Means	0	0	0	0	0	0.7	2	1	0	0	0	0	4

HAY SPRINGS, NEBR.

1888	0	0	0	0	0	15	7	0	1	0	0	0	13
1889	0	0	0	0	0	12	9	9	3	0	0	0	23
1890	0	0	0	0	1	3	14	7	0	0	0	0	25
1891	0	0	0	0	0	0	0	8	2	0	0	0	10
Means	0	0	0	0	0.2	2	7	6	1	0	0	0	16

HURON, S. DAK.

1881							4	6	0	0	0	0	
1882	0	0	0	0	0	0	2	6	3	0	0	0	11
1883	0	0	0	0	0	3	3	2	0	0	0	0	8
1884	0	0	0	0	0	2	0	0	2	0	0	0	4
1885	0	0	0	0	0	0	6	0	1	0	0	0	7
1886	0	0	0	0	1	1	14	9	2	0	0	0	27
1887	0	0	0	1	1	5	5	2	0	0	0	0	14
1888	0	0	0	0	0	0	0	0	0	0	0	0	0
1889	0	0	0	0	0	4	4	11	1	0	0	0	20
1890	0	0	0	0	1	3	13	8	1	0	0	0	26
1891	0	0	0	0	1	1	0	3	7	0	0	0	12
Means	0	0	0	0.1	0.4	2	5	4	2	0	0	0	13

MEADE, FORT, S. DAK.

1879							4	6	0	0	0	0	
1880	0	0	0	0		1	3	11	0	0	0	0	
1881	0	0	0	0	0	2	12	12	0	0	0	0	26
1882	0	0	0	0	0	0	3	8	3	0	0	0	14
1883	0	0	0	0	0	3	3	9	1	0	0	0	16

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Record of the number of days on which the maximum temperature equaled or exceeded 90° throughout the year—Continued.

MEADE, FORT, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884	0	0	0	0	0	3	1	5	0	0	0	0	9
1885	0	0	0	0	0	0	11	3	1	0	0	0	15
1886	0	0	0	0	3	2	15	14	1	0	0	0	35
1887	0	0	0	0	0	4	6	1	0	0	0	0	11
1888	0	0	0	0	0	1	7	0	4	0	0	0	12
1889	0	0	0	0	0	3	4	6	1	0	0	0	14
1890	0	0	0	0	1	1	17	7	0	0	0	0	26
1891	0	0	0	0	1	1	1	6	2	0	0	0	11
Means	0	0	0	0	0.4	2	7	7	1	0	0	0	17

MOORHEAD, MINN.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1881	0	0	0	0	0	0	3	1	0	0	0	0	4
1882	0	0	0	0	0	0	0	2	0	0	0	0	2
1883	0	0	0	0	0	2	2	0	0	0	0	0	4
1884	0	0	0	0	0	2	0	0	0	0	0	0	2
1885	0	0	0	0	0	0	1	1	1	0	0	0	3
1886	0	0	0	0	0	0	3	7	1	0	0	0	11
1887	0	0	0	0	3	3	2	0	0	0	0	0	8
1888	0	0	0	0	0	0	0	0	0	0	0	0	0
1889	0	0	0	0	0	0	1	2	1	0	0	0	4
1890	0	0	0	0	0	1	2	1	0	0	0	0	4
1891	0	0	0	1	1	1	0	3	3	0	0	0	9
Means	0	0	0	0.1	0.4	0.8	1	2	0.6	0	0	0	5

PEMBINA, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1873	0	0	0	0	0	0	0	0	0	0	0	0	0
1874	0	0	0	0	1	2	1	0	0	0	0	0	4
1875	0	0	0	0	0	0	0	0	0	0	0	0	0
1876	0	0	0	0	0	1	2	1	0	0	0	0	4
1877	0	0	0	0	0	0	1	0	0	0	0	0	1
1878	0	0	0	0	0	0	0	0	0	0	0	0	0
1879	0	0	0	0	0	1	0	0	0	0	0	0	1
1880	0	0	0	0	0	0	0	0	0	0	0	0	0
Means	0	0	0	0	0.1	0.5	0.5	0.1	0	0	0	0	1

RANDALL, FORT, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1875	0	0	0	0	0	3	4	4	2	1	0	0	14
1876	0	0	0	0	2	7	15	7	0	0	0	0	31
1877	0	0	0	0	0	2	8	5	3	0	0	0	18
1878	0	0	0	0	0	2	6	7	2	0	0	0	17
1879	0	0	0	0	2	4	10	7	0	6	0	0	29
1880	0	0	0	0	7	6	9	13	2	2	0	0	39
1881	0	0	0	0	0	2	8	18	2	0	0	0	30
1882	0	0	0	0	1	0	4	12	4	0	0	0	21
1883	0	0	0	0	0	3	4	4	1	0	0	0	12
1884	0	0	0	0	0	3	4	2	2	0	0	0	11
1885	0	0	0	0	0	4	17	1	4	0	0	0	26
1886	0	0	0	0	1	2	21	14	3	0	0	0	41
1887	0	0	0	3	3	9	12	3	2	0	0	0	32
1888	0	0	0	0	0	6	12	7	3	0	0	0	28
1889	0	0	0	0	2	10	10	15	2	0	0	0	39
1890	0	0	0	0	1	4	18	10	3	0	0	0	36
1891	0	0	0	0	2	1	0	2	9	0	0	0	14
Means	0	0	0	0.2	1	4	10	8	3	0.5	0	0	27

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Record of the number of days on which the maximum temperature equaled or exceeded 90° throughout the year—Continued.

SULLY, FORT, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1875				0	0	5	10	5	1	0	0	0	32
1876	0	0	0	0	2	8	13	9	0	0	0	0	37
1877	0	0	0	0	0	4	14	13	6	0	0	0	29
1878	0	0	0	0	0	3	14	10	2	0	0	0	25
1879	0	0	0	0	0	4	10	8	0	3	0	0	35
1880	0	0	0	0	5	5	12	11	1	1	0	0	30
1881	0	0	0	0	1	2	12	14	1	0	0	0	38
1882	0	0	0	0	0	1	7	20	10	0	0	0	24
1883	0	0	0	0	0	4	6	10	4	0	0	0	35
1884	0	0	0	0	0	12	7	11	5	0	0	0	31
1885	0	0	0	0	0	3	18	5	5	0	0	0	47
1886	0	0	0	0	1	4	21	18	3	0	0	0	27
1887	0	0	0	1	3	5	13	3	2	0	0	0	0
1888	0	0	0	0	0	0	0	0	0	0	0	0	24
1889	0	0	0	0	0	4	5	12	3	0	0	0	30
1890	0	0	0	0	0	5	16	8	1	0	0	0	40
1891	0	0	0	2	2	3	8	14	11	0	0	0	
Means	0	0	0	0.2	1	4	11	10	3	0.2	0	0	29

VALENTINE, NEBR.

1885									5	0	0	0	34
1886	0	0	0	0	1	1	16	13	3	0	0	0	14
1887	0	0	0	0	0	4	6	3	1	0	0	0	
1888	0	0	0	0	0	8	11	3	1	0	0	0	25
1889	0	0	0	0	0	3	6	13	3	0	0	0	25
1890	0	0	0	0	1	5	12	5	2	0	0	0	10
1891	0	0	0	0	1	0	0	4	5	0	0	0	
Means	0	0	0	0	0.5	4	8	7	3	0	0	0	22

ST. VINCENT, MINN.

1881				0	0	0	2	0	0	0	0	0	0
1882	0	0	0	0	0	0	0	0	0	0	0	0	3
1883	0	0	0	0	0	2	1	0	0	0	0	0	1
1884	0	0	0	0	0	1	0	0	0	0	0	0	1
1885	0	0	0	0	0	0	1	0	0	0	0	0	11
1886	0	0	0	0	0	0	6	5	0	0	0	0	3
1887	0	0	0	0	2	1	0	0	0	0	0	0	0
1888	0	0	0	0	0	0	0	0	0	0	0	0	5
1889	0	0	0	0	0	1	2	1	1	0	0	0	5
1890	0	0	0	0	0	3	1	1	0	0	0	0	
1891	0	0	0						0	0	0	0	
Means	0	0	0	0	0.2	1	2	0.8	0.1	0	0	0	4

SISSETON, FORT, S. DAK.

1876									0	0	0	0	
1877	0	0	0	0				0			0	0	
1878	0	0	0	0	0	0	1			0	0	0	
1879	0	0	0	0	0		0		0	0	0	0	
1880	0	0	0		0	0	1	1	0	0	0	0	
1881	0	0	0	0	0	0	0	1	0	0	0	0	1
1882	0	0	0	0	0	0	0	1	1	0	0	0	2
1883	0	0	0	0	0	2	2	0	0	0	0	0	4
1884	0	0	0	0	0	0	0	0	0	0	0	0	0
1885	0	0	0	0	0	0	1	0	2	0	0	0	3
1886	0	0	0	0	0	0	8	9	1	0	0	0	18
1887	0	0	0	1	1	1	1	0	0	0	0	0	4
1888	0	0	0	0	0	2	4	4	0	0	0	0	10
1889	0	0	0	0									
Means	0	0	0	0.1	0.1	0.5	2	2	0.4	0	0	0	5

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Record of the number of days on which the maximum temperature equaled or exceeded 90° throughout the year—Continued.

YANKTON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1873	0	0	0	0	0	2	6	12	3	0	0	0	23
1874	0	0	0	0	2	4	13	7	2	0	0	0	28
1875	0	0	0	0	0	2	1	0	0	0	0	0	3
1876	0	0	0	0	0	2	5	3	0	0	0	0	10
1877	0	0	0	0	0	0	3	2	0	0	0	0	5
1878	0	0	0	0	0	0	7	7	1	0	0	0	15
1879	0	0	0	0	2	2	8	5	0	0	0	0	17
1880	0	0	0	0	4	1	8	7	1	0	0	0	21
1881	0	0	0	0	0	3	9	13	1	0	0	0	26
1882	0	0	0	0	0	2	4	10	2	0	0	0	18
1883	0	0	0	0	0	3	7	2	0	0	0	0	12
1884	0	0	0	0	0	4	4	1	0	0	0	0	9
1885	0	0	0	0	0	2	8	0	3	0	0	0	13
1886	0	0	0	0	1	1	15	12	3	0	0	0	32
1887	0	0	0	1	1	4	8	6	2	0	0	0	22
1888	0	0	0	0	0	0	0	0	0	0	0	0	0
1889	0	0	0	0	1	5	5	6	0	0	0	0	17
1890	0	0	0	0	0	5	12	6	1	0	0	0	24
1891	0	0	0	0	0	1	0	0	2	0	0	0	0
Means	0	0	0	0	0.6	2	6	6	1	0	0	0	16

YATES, FORT, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1882	0	0	0	0	0	1	5	9	2	0	0	0	0
1883	0	0	0	0	0	5	10	8	3	0	0	0	26
1884	0	0	0	0	0	7	1	8	0	0	0	0	16
1885	0	0	0	0	0	3	7	4	3	0	0	0	17
1886	0	0	0	0	2	3	20	13	2	0	0	0	40
1887	0	0	0	0	1	4	9	5	0	0	0	0	19
1888	0	0	0	0	0	3	4	5	1	0	0	0	13
1889	0	0	0	0	0	3	4	10	1	0	0	0	18
1890	0	0	0	0	0	4	12	8	1	0	0	0	25
1891	0	0	0	2	1	1	0	9	4	0	0	0	17
Means	0	0	0	0.2	0.4	3	7	8	2	0	0	0	20

APPENDIX No. 63.

Dates of first and last killing frosts.

NORTH DAKOTA.

Stations.	Season of—	First frost.	Last frost.
Bismarck	1881-1882	Sept. 15	May 23
Fort Buford	1881-1882	Sept. 17	May 23
Bismarck	1882-1883	Sept. 23	May 11
Fort Buford	1882-1883	Sept. 9	June 2
Bismarck	1883-1884	Sept. 8	May 1
Fort Buford	1883-1884	Aug. 22	May 5
Bismarck	1884-1885	Sept. 27	May 9
Fort Buford	1884-1885	Sept. 30	May 11
Fort Totten	1884-1885	Sept. 30	May 17
Bismarck	1885-1886	Sept. 1	May 15
Fort Buford	1885-1886	Sept. 1	May 14
Fort Totten	1885-1886	Aug. 25	June 7
Bismarck	1886-1887	Sept. 18	May 17
Fort Buford	1886-1887	Sept. 16	May 17
Fort Totten	1886-1887	Aug. 31	June 24
Bismarck	1887-1888	Sept. 15	June 6
Fort Buford	1887-1888	Sept. 15	May 16
Fort Totten	1887-1888	Sept. 15	June 1
Bismarck	1888-1889	Sept. 12	May 14
Fort Buford	1888-1889	Sept. 25	May 9
Fort Totten	1888-1889	Aug. 17	.....
Bismarck	1889-1890	Sept. 26	May 15
Davenport	1889-1890	Sept. 15	May 21
Fort Buford	1889-1890	Sept. 11	May 26
Fort Yates	1889-1890	Sept. 15	May 15
Gallatin	1889-1890	Sept. 15	May 17
Grand Forks	1889-1890	.....	Mar. 21
Napoleon	1889-1890	Sept. 15	.....
New England City	1889-1890	Sept. 5	Mar. 26
Steele	1889-1890	Sept. 15	Mar. 17
Wahpeton	1889-1890	Sept. 14	Mar. 18
Bismarck	1890-1891	Sept. 13	May 5
Fort Buford	1890-1891	Sept. 12	May 15
Gallatin	1890-1891	Sept. 12	May 25
Davenport	1890-1891	Sept. 13	.....
Kelso	1890-1891	Aug. 22	.....
Napoleon	1890-1891	Aug. 4	May 25
New England City	1890-1891	Sept. 13	.....
Steele	1890-1891	Sept. 8	.....
Wahpeton	1890-1891	Aug. 22	May 25
Wild Rice	1890-1891	Sept. 12	May 3
Fort Yates	1890-1891	Sept. 12	May 25

APPENDIX No. 64.

Dates of first and last killing frosts.

SOUTH DAKOTA.

Stations.	Season of	First frost.	Last frost.
Fort Bennett	1881-1882	Oct. 13	May 22
Huron	1881-1882	Oct. 9	May 22
Yankton	1881-1882	Oct. 16	May 23
Deadwood	1881-1882	Sept. 30	May 23
Fort Bennett	1882-1883	Oct. 16	May 12
Huron	1882-1883	Sept. 21	Apr. 30
Yankton	1882-1883	Sept. 23	May 5
Deadwood	1882-1883	Oct. 10	May 15
Fort Bennett	1883-1884	Oct. 14	May 1
Huron	1883-1884	Sept. 8	May 2
Yankton	1883-1884	Oct. 2	Apr. 23
Deadwood	1883-1884	Sept. 21	May 6
Fort Bennett	1884-1885	Sept. 30	Apr. 24
Huron	1884-1885	Oct. 8	June 22
Yankton	1884-1885	Oct. 21	May 10
Deadwood	1884-1885	Sept. 30	June 16
Fort Bennett	1885-1886	Sept. 4	
Huron	1885-1886	Sept. 1	May 6
Fort Sully	1885-1886	Sept. 4	June 3
Yankton	1885-1886	Sept. 5	May 16
Deadwood	1885-1886	Sept. 1	May 16
Huron	1886-1887	Aug. 31	Apr. 25
Deadwood	1886-1887	Sept. 25	Apr. 24
Fort Sully	1886-1887	Sept. 30	
Yankton	1886-1887	Oct. 1	May 4
Deadwood	1887-1888	Oct. 9	
Garden City	1887-1888	Sept. 15	May 14
Highmore	1887-1888	Sept. 15	No rec'd.
Huron	1887-1888	Sept. 23	May 16
Rapid City	1887-1888		May 18
Fort Sully	1887-1888	Oct. 9	Apr. 7
Woonsocket	1887-1888	Sept. 19	May 16
Yankton	1887-1888	Oct. 11	May 12
Huron	1888-1889	Sept. 12	May 2
Rapid City	1888-1889	Oct. 2	May 15
Fort Sully	1888-1889	Sept. 29	May 2
Yankton	1888-1889	Oct. 2	May 3
Aberdeen	1889-1890		June 7
Alexandria	1889-1890	Sept. 16	May 16
Brookings	1889-1890	Sept. 15	May 16
Canton	1889-1890	Sept. 17	
Clark	1889-1890	Sept. 17	May 16
De Smet	1889-1890	Oct. 14	
Etta Mine	1889-1890		May 12
Flandreau	1889-1890		May 17
Fort Sully	1889-1890	Oct. 17	May 15
Highmore	1889-1890		May 19
Huron	1889-1890	Oct. 5	May 15
Kimball	1889-1890	Oct. 5	May 15
Millbank	1889-1890		May 5
Oelrichs	1889-1890		May 15
Onida	1889-1890		May 25
Parkston	1889-1890	Sept. 15	May 15
Rapid City	1889-1890	Sept. 15	May 13
Roscoe	1889-1890	Sept. 17	
Spearfish	1889-1890	Sept. 15	May 15
Vermillion	1889-1890		May 7

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Dates of first and last killing frosts—Continued.

SOUTH DAKOTA—Continued.

Stations.	Season of—	First frost.	Last frost.
Webster	1889-1890	Sept. 15	May 18
Wolsey	1889-1890	Sept. 15	May 15
Woonsocket	1889-1890	Sept. 15	May 16
Yankton	1889-1890	Oct. 5	May 5
Aberdeen	1890-1891	Sept. 8	May 25
Alexandria	1890-1891	Sept. 13	May 13
Brookings	1890-1891	Sept. 5	May 17
Canton	1890-1891	Sept. 13	Apr. 14
Clark	1890-1891	Sept. 6	May 16
Flandreau	1890-1891	Sept. 13	May 6
Fort Bennett	1890-1891	Sept. 13	May 10
Fort Meade	1890-1891	Sept. 19	May 10
Fort Randall	1890-1891	Sept. 13	May 8
Fort Sully	1890-1891	Sept. 19	May 5
Highmore	1890-1891	Sept. 13	
Howard	1890-1891	Sept. 12	May 4
Huron	1890-1891	Sept. 13	May 16
Millbank	1890-1891	Sept. 13	May 4
Onida	1890-1891	Sept. 13	May 21
Oelrichs	1890-1891	Sept. 6	May 9
Rapid City	1890-1891	Sept. 13	May 10
St. Lawrence	1890-1891	Aug. 22	May 4
Seranton	1890-1891	Sept. 13	
Sioux Falls	1890-1891	Sept. 13	
Spearfish	1890-1891	Oct. 18	May 10
Vermillion	1890-1891	Sept. 13	
Webster	1890-1891	Aug. 22	
Wolsey	1890-1891	Sept. 13	May 3
Woonsocket	1890-1891	Aug. 22	
Yankton	1890-1891	Sept. 13	

APPENDIX No. 65.

Monthly absolute maximum temperatures, with monthly and annual averages at stations in North Dakota.

ABERCROMBIE, FORT, N. DAK.

[Letters prefixed to records indicate the number of days of observations missing, thus the letter d shows four days not recorded.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1860								102	86	78	51	40	
1861	31	38	46	67	80	94	95	98	90	77	54	40	68
1862	30	38	47	70	86	94	93	91	94	78	70	50	70
1863	33	37	41	83	93	99	98						
1864												40	
1865	34	38	45	68	89	90		92	89	82	67	40	
1866	39	36	42		89			94	94	94	58	36	
1867	28	33	32	66	84	96		97	89	80	71	35	
1868	33	37	49	78	87	97	92	88	74	68	68	38	67
1869	43	34	47	74	90	88	98	96	90	72	78		
1870	30	34	41	83	90	98	95	99	86	78	61	50	70
1871	35	33	47	70	96	96	104	101	94	82	57	34	71
1872	30	38	32	76	96	94	95	96	85	81	49	35	67
1873	29	36	41	60	75	99	102	93	80	78	55	32	65
1874	39	31	42	80	102	95	96	94	98	79	67	46	72
1875	17	24	45	65	93	94	96	90	98	90	59	47	68
1876	36	27	48	80	90	102	98	100	79	72	50	42	69
1877	38	48	50	72	84		92	90	92				
Means	33	35	43	73	89	95	96	95	89	79	61	40	69

BATHGATE, N. DAK.

1891										70	60	41	
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BERTHOLD, FORT, N. DAK.

1866									89	92	58	61	
1867	43	46	43	74	81								

BISMARCK, N. DAK.

1874									90	83	54	43	
1875	38	30	51	67	88	89	95	91	85	82	58	55	68
1876	48	48	42	76	86	93	100	105	78	74	67	43	72
1877	44	60	49	66	84	82	91	92	92	67	56	56	71
1878	42	50	72	71	74	92	100	96	91	70	60	48	72
1879	46	44	68	75	76	91	95	90	81	88	66	36	71
1880	49	55	67	74	92	85	93	101	82	80	63	44	74
1881	39	46	45	80	85	90	102	97	90	71	63	60	72
1882	40	60	67	72	77	89	90	99	94	67	50	38	70
1883	40	40	55	73	82	99	92	92	92	73	60	54	71
1884	42	44	58	70	80	92	89	91	81	81	64	45	70

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly absolute maximum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

BISMARCK, N. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1885	39	48	49	72	83	87	97	92	95	80	51	53	71
1886	39	56	61	81	92	92	102	104	92	81	58	47	76
1887	44	45	54	87	91	97	96	91	85	73	73	47	74
1888	40	46	47	81	74	95	96	98	93	79	59	57	72
1889	46	48	69	85	81	97	95	102	93	86	63	42	76
1890	39	46	52	82	83	91	98	103	88	84	70	64	75
1891	50	48	50	90	93	87	86	94	92	78	63	46	73
Means	41	48	56	77	84	91	95	96	83	78	61	49	72

BUFORD, FORT, N. DAK.

1866									97	96		60	
1867	52	50	44	80	82	96		100	88	76	57	40	
1868	28	44	78	88	89	96	106	99	71	78	67	45	74
1869	43	40	62	70	82	95	100	100	99	78	78	40	74
1870	43	44	52	87	95	106	99	97	90	88	59	49	76
1871	40	40	69	70	99	95	102	100	90	75	53	47	73
1872	41	47	46	72	90	95	104	101	97	85	48	48	73
1873	45	40	53	69	74	91	100	102	84	80	60	43	70
1874	38	35	50	82	90	101	103	90	96	80	57	39	72
1875	34	32	47	69	96	85	95	92	82	79	59	50	68
1876	45	43	41	79	80	91	99	101	76	74	62	42	69
1877	37	51	49	73	84	87	90	90	89	75	65	55	70
1878	58	49	68	68	70	86		94	71	52	60	45	
1879	45	44	70	81	85	89	94	98	95	95	62	40	75
1880	47	50	68	80	95	95	96	92	85	77	61	46	74
1881	36	47	51	92	90	96	104	102	87	70	58	51	74
1882	45	57	70	75	79	91	97	107	100	65	55	46	74
1883	45	41	53	76	87	107	96	96	91	74	58	46	73
1884	46	45	59	76	85	99	93	100	80	86	62	57	74
1885	45	46	58	75	84	91	96	90	90	78	58	59	73
1886	44	51	69	79	89	94	106	104	86	85	57	45	76
1887	42	47	59	88	93	98	98	92	89	80	68	45	75
1888	42	49	51	82	75	100	95	96	93	76	54	58	69
1889	45	51	72	76	76	101	98	99	87	89	61	44	75
1890	42	49	51	82	83	88	100	98	91	80	65	56	74
1891	50	39	58	87	90	82	84	97	87	75	68	47	72
Means	43	45	58	78	86	95	98	97	88	79	61	48	73

CARRINGTON, N. DAK.

1889			77	87	85	97	101	99					
1891								98	96		62	46	
Means								98					

CHURCHS FERRY, N. DAK.

1891						86	83	90					
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DAVENPORT, N. DAK.

1890	41	41	45	83	89	90	100	94	90	79			
1891					91	93	85	94					
Means					90	92	92	94					

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute maximum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

DICKINSON, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891											71	45	.....

ELLENDALE, N. DAK.

1890												53	.....
1891	48	41	54	88	95	96	89	100	96	76	62	44	74
Means												48	

FARGO, N. DAK.

1891						95	84	95	92	79	62	44	
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GALLATIN, N. DAK.

1889				72	82	96	102	98	96	80	60	40	
1890	32	40	44	82	84	96	102	100	90	84	62	50	72
1891	46	40	50	90	92	94	84	98	96	74	64	42	72
Means	39	40	47	81	86	95	96	99	94	76	62	44	72

GRAFTON, N. DAK.

1891	46	30			91	84	85	92	88	71	61	41	
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GRAND FORKS, N. DAK.

1890				82	81	99	104			76	63	48	
1891	43	33				92		92	87		61	45	
Means						96					62	46	

GRAND RAPIDS, N. DAK.

1891							95	102	97	77	65	42	
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HOPE, N. DAK.

1891						90	88	93	85	71	63		
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JAMESTOWN, N. DAK.

1891							85						
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KELSO, N. DAK.

1890							94	95	85	77	60	52	
1891	45	35	47	89	92	94	90	93	92	72	64	48	72
Means							92	94	88	74	62	50	

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly absolute maximum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

DAKOTA, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891						98	81	93	.....	75	57	40	.....

LEECH FARM, N. DAK.

1888				71	72	97	94	95	95	88	79	58	.....
1889	42	40	68	83	91	92	96	95	95	73	58	44	73
1890	41	41	45	83	89	90	100	94	90	79	.....	.....	.....
Means	41	40	56	79	84	93	97	95	93	80	68	51	73

LINCOLN, ABRAHAM, FORT, N. DAK.

1873							95	96	95	92	65	50	.....
1874	49	53	56	92	98	98	103	94	101	77	57	44	77
1875	32	32	46	60	89	89	96	97	87	84	58	50	68
1876	53	65	43	76	90	96	100	110	80	76	82	41	77
1877	45	60	52	66	89	97	95	95	85	70	60	60	73
1878	50	52	74	78	86	90	99	98	98	68	59	44	75
1879	45	45	66	.....	74	89	96	93	80	92	45	30	.....
1880	49	36	64	65	95	84	94	.....	84	79	62	41	.....
1881	46	34	68	79	84	92	103	98	99	71	58	46	73
1882	42	50	66	72	73	85	88	100	95	68	50	40	69
1883	34	42	50	74	84	104	94	92	93	74	60	52	71
1884	40	44	60	72	84	92	88	96	82	80	65	48	71
1885	38	42	49	74	84	90	100	96	100	84	55	57	72
1886	34	62	64	83	95	96	106	109	95	85	63	43	78
1887	36	37	43	91	92	101	96	90	90	88	75	48	74
1888	45	49	47	84	76	98	97	102	96	80	60	59	74
1889	44	47	67	83	80	98	96	104	96	83	64	44	76
1890	41	48	51	83	80	93	102	105	89	80	69	62	75
1891	50	48	50	68		88	83						
Means	43	47	56	76	85	93	96	99	91	79	61	48	73

MINOT, N. DAK.

1891											41	42	
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NAPOLEON, N. DAK.

1889						98	96	105	96	82	59	49	
1890	40	42	49	82		95	99	101	87	78	67	57	
1891	47	42	42	90	92	92	85	96	92	72	58	38	70
Means	44	42	46	86	.....	95	93	101	92	77	61	46	73

NEW ENGLAND CITY, N. DAK.

1889		43	66	85	80	104	97	101	86	85	61	50	.....
1890	42	48	60	87	87	88	102	99	87	80	66	58	75
1891	58	44	57	.....	.....	.....	.....	.....	91	.....	.....	.....	.....
Means	50	45	61	86	84	96	100	100	88	82	64	54	77

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute maximum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

PEMBINA, FORT, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1871									82	72	41	36	
1872	31	39	32	59	79	94	97	100	85	77	48	34	65
1873	31	33	43	64	81	93	89	91	80	82	45	35	64
1874	37	32	47	76	98	94	94	94	92	76	51	39	69
1875	21	22	46	64	91	87	93	88	90	82	46	41	64
1876	36	33	48	76	86	92	95	96	77	74	65	41	68
1877	50	44	46	69	80	90	89	89	88	69	56	49	68
1878	41	48	70	73	73	87	90	89	81	72	53	41	68
1879	35	31	53	73	79	90	90		80	90	50	37	
1880	42	36	46	72	87	86	91	82	80	78	52	36	66
1881	34	32	42	72	85	84	93	89	80	68	47	35	63
1882	30	40	41	58	77	85	90	91	89				
1883	23		40	67	74	91	93	86	86	76	57	45	
1884	34	34	39	66	83						58	44	
1885	39	40	41	68	84	89	94	90	83	73	44	40	65
1886	24	47	42	82	86	91	96	101	88	83	58	33	69
1887	22	33	44	71	92	95	91	88	87	73	68	42	67
1888	30	38	42	76	80	95	94	99	84	78	53	43	68
1889	51	36	70	74	83	96	97	97	96	78	63	40	73
1890	35	33	47	77	83	97	96	94	84	82	64	48	70
1891	38	28	48	90	93	92	85	93	91	75	64	50	71
Means	34	34	46	71	84	91	92	92	85	77	54	40	67

POWER, N. DAK.

1891						94	88	94	94	78	69	45	
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RANSOM, FORT, N. DAK.

1868												46	
1869	34	39	63	73	83	86	103	97	87	70	70	35	70
1870	32	32	47	82	85	97	99	102	84	81	58	54	71
1871	37	38	46	64	89	97	102	100	99	81	54	36	70
1872	34	39	39	76	91	98	95						
Means	35	37	49	74	87	94	100	100	90	77	61	42	70

RICE, FORT, N. DAK.

1868							107	100	72	57	60	41	
1869	48	45	66	72	90	91	93			76	71	44	
1870	44	48	66		90	101	102	98	82	80	68	50	
1871	49	46	57	73	89	97	110	103	90	78	54	46	74
1872	40	45	42	78	79	101	99	102	94	84	56	42	72
1873	40	42	54	74	80	94	104	98	96	89	70	42	74
1874	46	40	64	87	97	102	108	102	106	83	54	41	78
1875	36	32	54	72	92	90	101	94	92	86	67	57	73
1876	52	47	50	70	90	94	102	109	79	74	64	43	73
1877	44	56	54	72	84	90	95	100	102	70	60	55	74
1878	39	50	74	70	75	90	103	100	97	70			
Means	44	45	58	74	86	95	102	101	91	77	62	46	73

RICHARDTTON, N. DAK.

1884		38	64	71	76	88	88	91	78	80	68	41	
1885	37	40	48	70	80	83	95	94	97	79	56	59	70
1886	32	51	52	76	87	88	104	106		80	58	38	
1887	30		52			97		84		78	70	40	
Means	33	43	54	72	81	89	96	94	87	79	63	44	70

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly absolute maximum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

ST. JOHNS, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891									84	71	53	42	

ST. THOMAS, N. DAK.

1891							94	90	90	78	60	42	
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SANBORN, N. DAK.

1890			41										
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SEWARD, FORT, N. DAK.

1873	30	37	46	70	76	98	96	99	84	83	64	41	69
1874	42	37	58	87	99	98	103	94	99	78	49	42	74
1875	27	28	56	64	88	<i>p</i> 78	96	92	87	79	57	47	67
1876	40	36	36	81	88	96	99	104	82	69	68	37	70
1877	37	58	44	63	81	83	89	86	80				
Means	35	39	48	72	86	91	97	95	86	77	59	42	69

SHEYENNE, N. DAK.

1872						96	96	<i>p</i> 94					
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SPIRITWOOD, N. DAK.

1881		32	40	75	90								
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STEELE, N. DAK.

1889				87	84	99	101	110	99	94	63	43	
1890	44	40	48	88	86	92	108	104	97	86	72	61	77
1891	48	45	50	92	93	89	87	96	97	83			.....
Means	46	42	49	89	88	93	99	103	98	88	67	52	76

STEVENSON, FORT, N. DAK.

1868	29	51	65	78	84	93	100	95	75	73	64	42	71
1870	34	44	49	82	94		102	94	85	78	59	47	.....
1871	45	43	52	65	90	91	99	102	86	75	50	36	70
1872	35	48	45	76	94	100	103	101	86	81	50	40	72
1873	37	43	51	69	75	91	91	92	88	86	59	42	69
1874	43	43	56	86	94	101	103	93	97	83	69	47	76
1875	37	29	52	63	83	86	90	88	86	85	55	50	67
1876	44	45	43	74	82	89	100	100	76	75	68	43	70
1877	40	55	40	68	82		<i>j</i> 93	93	95	72	65	55	.....
1878	42	52	71	73	74	90	95		94	78	59	55	.....
1879	43	42	59	77	76	87	95	90	85	90	58	33	70
1880		42	62	82	95	87	93	100	85	86	62	39	.....
1881	36	38	45	78	89	91	103	96	90	67	58	55	71
1882	38	54	57	66	79	89	91	102	96	67	55	41	70
1883	38	42	46	75									.....
Means	39	45	53	74	85	91	97	96	87	78	59	45	71

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute maximum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

TOBACCO GARDEN, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1882		54	66	72	81	90	93	102	99	64	55	27	-----
1883					83								-----
Means					82								-----

TOTTEN, FORT, N. DAK.

1869								94	87	70	76	30	-----
1870	30	38	52	83	88	98	91	90	86	80	60	48	70
1871	40	35	39	63	89	89	97	96	86	74	45	36	66
1872	34	40	30	56	77	94	99	100	86	77	40	36	64
1873	29	38	39	60	74	93	92	93	83	81	58	40	65
1874	40	37	43	77	97	94	98	90	95	79	51	36	70
1875	16	26	46	60	83	81	90	89	84	84	50	46	63
1876	39	33	38	76	81	89	94	105	76	74	68	34	67
1877	36	45	41	64	80	85	89	90	92	66	60	49	66
1878	41	46	69	67	68	89	93	94	87	72	57	39	68
1879	37	40	60	70	79	87	94	93	81	90	56	40	69
1880	35	40	45	72	85	84	86	82	81	79	50	37	65
1881	35	31	40	80	86	82	95	95	83	64	45	49	65
1882	30	42	43	62	78	85	91	94	93	69	49	32	64
1883	35	35	41	71	76	104	88	88	92	74	53	40	66
1884	35	38	42	65	82	94	87	94	88	86	62	43	68
1885	40	39	40	74	86	88	93	86	96	79	44	43	67
1886	32	45	44	80	86	88	95	103	81	80	63	37	70
1887	35	35	52	84	90	91	90	84	81	68	70	41	68
1888	35	38	41	74	76	93	88	94	87	78	59	54	68
1889	45	46	71	84	82	95	96	97	98	82	58	36	74
1890	35	40	40	79	75	93	98	95	87	78	76		-----
Means	35	38	46	71	82	90	93	93	87	76	57	40	67

VALLEY CITY, N. DAK.

1891									94	72	62	42	-----
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WAHPETON, N. DAK.

1889							95	96	97	81	75	48	-----
1890	47	52	55	88	88	93	99	99	89	80	60	54	75
1891	52	54	56	88	90	90	90	94	94	80	58	45	74
Means	50	53	56	88	89	92	94	96	93	80	64	49	75

WILD RICE, N. DAK.

1890						89	97	85		62	60	54	-----
1891			49	90	92							42	-----
Means												48	-----

WILLOW CITY, N. DAK.

1891								94	92	75	45	42	-----
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WOODBIDGE, N. DAK.

1891										79	64	37	-----
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Monthly absolute maximum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

YATES, FORT, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1882	46	56	54	78	81	92	96	102	99	74	57	63	76
1883	43	47	65	77	85	108	98	96	96	78	64	55	76
1884	42	49	56	70	83	97	96	96	90	89	68	52	74
1885	45	49	56	76	89	93	97	98	98	87	58	56	75
1886	35	63	67	81	98	96	107	106	95	85	61	40	78
1887	29	46	54	88	92	101	99	95	-----	81	76	45	-----
1888	50	47	49	83	76	100	102	101	95	82	59	64	76
1889	53	52	72	81	85	99	99	102	97	84	67	52	79
1890	57	54	58	86	87	97	100	101	92	81	71	53	78
1891	52	47	58	96	95	93	88	103	98	78	68	46	77
Means	45	51	59	82	87	98	98	100	96	82	64	63	77

Monthly absolute maximum temperatures, with monthly and annual averages, at stations in South Dakota.

ABERDEEN, S. DAK.

1890	-----	-----	47	89	93	96	103	100	88	82	63	51	-----
1891	48	39	50	87	90	94	88	103	97	79	65	39	73
Means	-----	-----	48	88	92	95	96	102	92	80	64	45	-----

ALEXANDRIA, S. DAK.

1882	-----	-----	70	80	80	-----	-----	-----	-----	-----	-----	-----	-----
1889	-----	-----	-----	-----	-----	98	104	98	92	-----	58	59	-----
1890	45	50	55	83	96	98	103	103	95	79	68	62	78
1891	54	46	52	90	95	92	93	100	97	-----	-----	50	-----
Means	50	48	59	84	90	96	100	100	95	-----	63	57	-----

ARMOUR, S. DAK.

1889	-----	-----	-----	-----	89	98	98	97	-----	-----	-----	-----	-----
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BANGOR, S. DAK.

1891	-----	-----	-----	-----	-----	96	-----	-----	-----	-----	-----	-----	-----
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BENNETT, FORT, S. DAK.

1880	-----	-----	-----	-----	-----	-----	-----	-----	-----	90	63	50	-----
1881	44	43	56	75	92	98	101	104	91	72	65	62	75
1882	55	63	78	86	82	90	94	104	95	76	58	57	78
1883	47	60	72	78	85	97	100	98	95	83	63	56	78
1884	49	50	71	74	86	97	97	98	92	85	70	58	77
1885	49	51	63	78	87	90	102	97	94	83	54	-----	-----
1890	46	55	68	89	91	102	107	106	91	86	75	61	81
1891	55	43	57	95	96	95	96	108	103	82	-----	-----	-----
Means	49	52	66	82	88	96	99	102	94	82	64	57	78

BRITTON, S. DAK.

1891	-----	-----	-----	-----	-----	-----	-----	-----	96	82	65	40	-----
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute maximum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

BROOKINGS, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1888						95	101	94	93	82	69	58	
1889	41	43	54	83	91	93	98	97	89	76	60	58	74
1890	43	48	54	84	90	90	94	99	91	74	68	56	74
1891	52	48	50	88	92	89	88	100	98	80	62	52	75
Means	45	46	53	85	91	92	95	98	93	78	65	56	75

CANTON, S. DAK.

1889								96	89	78	56	54	
1890	53	58	54	84	91	98	101	95	87	76	65	58	77
1891	52	40	48	86	90	87							
Means	52	49	51	85	90	92		96	88	77	60	56	

CASTLEWOOD, S. DAK.

1891								99	96	82	61	50	
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CLARK, S. DAK.

1889							100	100	92	85	57	55	
1890	44	50	59	85	93	95	105	99	91	79	64	54	76
1891	50	46	55	87	102	90	93	100	100	82	63	48	76
Means	47	48	57	86	98	92	99	100	94	82	61	52	76

CROSS, S. DAK.

1890				69		97		96	86		74		
1891		54	60		86	85	86	90	88	81	78	60	
Means						91		93	87		76		

DAKOTA CITY, S. DAK.

1886					86								
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DAKOTA, FORT, S. DAK.

1866									80				
1868									87	85	64	37	
1869	40	39	63	69	87								
Means													

DEADWOOD, S. DAK.

1878	54	59	66	65	68						68	54	
1879	56	53	71	71	81	92	92	92	84		63	50	
1880	55	55	63	74	84	95	90	93	86	77	61	58	75
1881	47	58	65	82	80	95	102	101	91	73	60	58	76

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GARY, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891							92	97	96	80	61	50	

1888	45	85	74	98	108	96	95	90	62	56
1889	40									

1888									84	87	68	
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1879	63	56	82	80	91	93	96	103	87	93	76	38	80
1880	60	65	64	90	96	91	102	103	89	86	65	49	80
1881	38	50	46	78	91	97	94	100	90	81	60	61	74
1882	48	63	68	88	82	89	95	97	97	80	64	56	77
1883	38	43	64	74	74	96	97	96	90	80	65	55	73
1884	48	49	68	75	86								
Means	49	54	65	81	87	93	97	100	91	84	66	52	77

										81	58	39	
1886													
1887	33	37	64	85	87	90	91	80					

1888		51	57			104	97						
1890			62	87	93	96	105	105	96	81	69	57	
1891	48	41	52	88									
Means			57	88		100	101						

1890	53	44	52	90	87	89	100	94	76	65	54
1891							95	98	82	64	55
Means							98	96	79	64	54

[illegible]

Monthly absolute maximum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

HURON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1881							91	96	88	74	65	58	
1882	46	57	75	81	77	89	93	94	93	81	63	50	75
1883	45	48	70	79	79	94	99	91	88	77	62	57	74
1884	44	44	65	72	83	94	90	89	96	82	67	54	73
1885	46	50	64	75	86	89	98	89	91	82	55	53	73
1886	42	60	65	83	96	90	104	100	95	85	60	48	77
1887	38	47	68	94	92	97	99	91	89	78	76	40	74
1888	40	45	50	80	74	95	102	96	88	79	66	63	73
1889	42	45	70	84	90	98	104	97	92	78	62	55	76
1890	43	45	50	84	92	94	103	102	94	79	70	54	76
1891	55	46	50	87	92	92	90	97	96	82	62	55	77
Means	44	49	63	82	86	93	98	95	92	80	64	53	75

KIMBALL, S. DAK.

1889						99	109	99		77			
1890	45	56	60	82	91	97	105	102	95	74	62	60	77
1891	56	44	51	87	94	89	91	103	98	84	68	56	77
Means	50	50	56	84	92	95	102	101	96	76	65	58	77

LEAD CITY, S. DAK.

1878						81	92	85	86	72			
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LOWER BRULE AGENCY, S. DAK.

1875									100	90	73	67	
1876	62	75	55	87	95	105	105	101	90	80	70	55	82
1877	50	67	57	74	87	104	101	99	95	77	65	56	78
1878	49	63	81	81	82	91	98	97	96	81	65	63	78
Means	54	68	64	81	88	100	101	99	95	82	68	60	80

MEADE, FORT, S. DAK.

1879							100	100	90	90	73	51	
1880	62	60	72	81		97	93	101	88	82	71	59	
1881	54	67	61	89	84	102	108	107	90	75	67	61	80
1882	55	62	71	81	78	84	94	105	92	73	71	57	77
1883	50	60	71	71	84	100	98	98	94	76	71	69	78
1884	54	57	66	73	82	97	95	96	83	86	71	70	78
1885	58	65	64	78	82	84	99	95	94	81	66	69	77
1886	52	68	72	78	94	95	106	103	94	82	60	53	80
1887	49	71	73	86	88	98	100	98	87	82	72	52	80
1888	61	59	67	84	77	96	98	90	93	75	55	55	76
1889	48	57	68	72	79	94	97	100	91	86	64	66	77
1890	54	63	64	81	91	96	101	101	87	74	70	73	80
1891	55	58	61	83	91	91	91	100	96	80	76	56	78
Means	53	62	68	80	85	94	98	100	91	80	68	61	78

MILLBANK, S. DAK.

1890				60	87	98	98	106	97	85	78	60	
1891	60	48	56	88	95	90	90	102	98	84	62	54	77
Means				74	91	94	94	104	98	84	70	57	

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute maximum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

MITCHELL, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891							88	94	94	84	65	63	

MORRISTON, S. DAK.

1878												45	
1879	65	58	84	82	92	90	100	102	93	95	70	47	82
1880	70	70	72	85	96	92	102	104			66	55	
1881	40	44	50	83	91	94	100	100	98	80	70	60	76
1882	40	60	65	68	82	90	96	96	96	84	66	48	74
1883	52	70	77	82	72	96	106	98	74				
1884			70	78	85	98	98						
Means	53	60	70	80	86	93	100	100	90	86	68	51	78

OELRICHS, S. DAK.

1890			69	78	91		104	104	93	81	70	60	
1891	50	49	60	102	94	94	96	104	97	76	80	57	80
Means			64	90	92		100	104	95	78	75	58	

OLIVET, S. DAK.

1877						89	102	94	93	79	59	56	
1878	48	62	77	80	84	91	100	103	96	81	74	52	79
1879	58	53	84	82	92	94	102	98	89	91	60	47	79
1880	59	70	72	85	93	95	98	106	95	90	64	54	82
1881	39	44	54	78	93	93	100	98	97	76	70	62	77
1882	48	70	82	86	85	90	92	100	96	80	66		
Means	50	60	74	82	89	92	99	100	94	83	65	54	78

ONIDA, S. DAK.

1890	40	46	56	84	90		104	104	88	84	69		
1891	48	40	48	88	90	96	90	102	99	80	72	41	76
Means	44	43	52	86	90		97	103	94	82	70		

PARKER, S. DAK.

1891							89	99	96		65	59	
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PARKSTON, S. DAK.

1887		40	60	92	98	99	104	98	93	79	82	48	
1888	42	52	52	82	80	96	102	97			78	65	
1889	50	54	70			94	100	96	90	81		66	
1890	52	58	56	82	88	92	95					70	
1891	68	46	48	82	86	88	92	98	96	84	72	54	76
Means	52	54	57	84	88	94	99	97	93	81	77	61	78

Monthly absolute maximum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

PIERRE, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891							90	104	101	81	80	56	

PLANKINTON, S. DAK.

1891						90	89	98					
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RANDALL, FORT, S. DAK.

1860		68	19		94	91	96	102	90	90	74	56	
1861	38	60	62	88	84	98	106	106	92	82	70	67	79
1862	44	54	79	78	92	98	105	98	99	88	66	58	80
1863	54	54	76	80	92	102	104	108	106	84	66	60	82
1864	65	67	73	87		105	106	100	99		65	47	
1865	52	52	72	82	101				100	92			
1866									87	87	74	44	
1867	44	48	36	73	81	100	94	100				60	
1868	50	58	74	74	81	92	106	98	90	90	75	53	70
1869	59	56	70	76	86	89	96		91	80	80	47	
1870	51	65	51	88	92	104	107	100	92	80	73	67	81
1871	61	61	76	76		96	103	102	99	85	72	50	
1872	51	57	60	79	96	96	94	104	99	90	60	50	78
1873	49	63	73	85	83	97	100	103	99	84	75	48	80
1874	56	58	66	95	99	102	112	103	106	89	81	59	86
1875	35	32	73	80	90	99	98	94	92	92	70	62	76
1876	67	77	50	86	91	102	106	99	87	78	79	58	82
1877	63	66	67	76	85	92	98	104	94	75	63	57	78
1878	50	61	77	80	80	92	98	102	97	82	75	65	80
1879	68	62	83	83	95	97	100	107	89	93	79	42	83
1880	65	71	80	88	96	93	97	103	92	94	60	57	83
1881	42	47	46	80	89	94	97	104	102	77	78	57	76
1882	57	70	85	86	91	90	96	94	96	82	65	59	81
1883	55	60	74	78	79	95	99	99	92	82	68	64	79
1884	48	53	70	74	89	96	95	96	97	89	78	58	79
1885	52	56	68	81	90	98	107	91	93	83	66	61	79
1886	53	65	69	84	97	99	110	101	98	85	67	68	83
1887	51	48	69	94	92	99	101	95	94	81	77	40	78
1888	46	55	59	87	73	99	107	100	91	90	72	68	79
1889	45	53	74	86	95	99	105	100	94	79	62	65	80
1890	58	59	65	84	92	96	104	103	98	80	75	70	82
1891	57	47	52	87	92	92	88	95	94	86	69	61	77
Means	53	58	66	80	90	97	101	100	95	85	69	57	79

RAPID CITY, S. DAK.

1881			67	87	85	100	106	104	92	71	67	60	
1882	56	65	75	82	89	90	97	103	97	75	67	57	79
1883	46	60	72	70	79								
1888	66	59	66	84	75	99	100	91	94	79	68	68	78
1889	57	58	69	80	82	95	100	100	94	86	72	61	80
1890	56	66	68	82	90	99	99	101	92	79	75	75	82
1891	59	55	64	87	88	89	92	100	94	79	77	60	79
Means	57	60	69	82	84	95	99	100	94	78	71	64	79

REDFIELD, S. DAK.

1889				71	88	100							
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute maximum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

ROSCOE, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1889					75	103	106	108	91	78			

ST. LAWRENCE, S. DAK.

1890								101	92	80		58	
1891	53	47	52	92	90	98	92	101			68	58	
Means								101				58	

SCRANTON, S. DAK.

1890	40	44	60	87	94	97	100	102	89	75	66	55	76
1891	50	44	55	93									
Means	45	44	58	90									

SIOUX FALLS, S. DAK.

1890						92	96	98	87	74	60	52	
1891	50	43	46	90			89	90	96	82	62	55	
Means							92	94	92	78	61	54	

SISSETON, FORT, S. DAK.

1867	31	35	35	72	81	90	92		89	85	66		
1868	33												
1869		34	54	65	80	85	88	85	88	75	74	35	
1870	28	34	42	81	83	90	93	95	79	76	58	55	68
1871	35	42	48	84	84	88	102	94	93	75	59	36	70
1872	37	39	35	79	90	93	99	100	86	84	42	35	68
1873	32	36	43	67	70	92	98	95	88	78	55	33	66
1874	40	32	51	80	93	96	100	88	101	80	60	46	72
1875	22	24	59	62	85	86	91	93	89	85	64	53	68
1876	44	48	54	75	87	102	94	100	76	72		40	
1877	37	47	44	68	75			90					
1878	40		62	72	82	83	91			74		39	
1879	44	40	72	73	86		90			87	56	33	
1880	44	53	54			83	92	96		84	86	39	
1881	35		37	76	86	85	89	91	83	71	57	45	
1882	37	51	60	76	73	80	82	93	93	71	48	31	68
1883	35	39	42	73	74	93	95	90	86	71	57	72	69
1884	45	42	46	65	79	89	85	86	86	78	62	42	67
1885	40	41	49	69	81	85	92	89	96	80	50	50	69
1886	45	54	61	79	86	88	98	100	94	80	60	40	74
1887	32		48	91	94	91	92	88	80	75	73	34	
1888	38	40	42	70	70	95	100	95	88	77	60	55	69
1889	34	36	69	78									
Means	37	40	50	74	82	89	93	93	88	78	59	43	69

SMITHVILLE, S. DAK.

1881							108	112	98	82	62	64	
1882	54	65	72	83	82	92							

SPEARFISH, S. DAK.

SPRING LAKE, S. DAK.

SULLY, FORT, S. DAK.

TYNDALL, S. DAK.

VERMILLION, S. DAK.

WATERTOWN, S. DAK.

[illegible]

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute maximum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

WEBSTER, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1882						90	96	96	98	83	53	44	
1883	39	58	60	83	80	95	108	100	96	83	75	66	79
1884	39	37	54	68	87	102	97	95	93	88	75	61	75
1885	55	62	70	79	91	94	99	99	98	83	52	56	78
1886	44	61	69	81	93	95	102	106	97	85	63	44	78
1887	34	45	70	94	94	94	96	89	87	73	77	38	74
1888	43	47	50	75	74	98	101	97	89	81	69	61	74
1889	38	41	71	81	92	94	96	100	92	81	60	49	75
1890	50	50	51	80	90	88	98	98	85	77	70	56	74
1891	51	45	47	87			92	104	104	88	68	51	
Means	44	49	60	80	87	94	98	98	94	82	66	53	75

WENTWORTH, S. DAK.

1883								81					
1885				73	83	87	94						
1891											69	51	

WESSINGTON SPRINGS, S. DAK.

1891							88	102	97	84	64	55	
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WICKLOW, S. DAK.

1883	40	40		71		92	95	97	97			42	
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WOLSEY, S. DAK.

1889	40	41	70	80	88	97	105	96	90	74	60	50	74
1890	44	48	52	82	96	95	104	103	96	75	68	55	76
1891	54	44	52	89	92	95	94	102	99	86	64	47	77
Means	46	44	58	84	92	96	101	100	95	78	64	51	76

WOONSOCKET, S. DAK.

1888				84	80	99	107	99	90	79	64	63	
1889	45	41	73	88	92	99	104	99	94	77	62	59	78
1890	44	48	54	84	96	99	105	104	95	80	69	57	77
Means	44	44	63	85	89	99	105	101	93	78	65	60	77

YANKTON, S. DAK.

1873				73	80	94	96	103	91	86	66	45	
1874	52	58	59	89	92	94	97	101	95	85	71	56	79
1875	32	31	72	82	89	92	93	87	89	87	65	62	73
1876	59	68	45	80	87	97	93	93	82	77	76	54	76
1877	51	59	65	78	81	87	96	93	89	73	57	57	73
1878	46	62	77	80	78	89	94	97	92	83	73	55	77
1879	62	62	87	80	93	92	98	97	85	89	73	45	80
1880	67	66	68	82	94	94	97	99	91	84	62	54	80
1881	36	52	44	79	88	96	98	101	100	76	65	57	74
1882	54	64	80	86	88	93	96	95	93	82	62	56	79
1883	44	50	70	78	89	95	103	92	89	81	67	60	77

Monthly absolute maximum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

YANKTON, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1884	50	52	66	72	82	94	94	90	88	87	66	57	75
1885	50	53	66	77	86	92	101	89	92	83	68	59	76
1886	42	66	59	80	95	90	103	99	92	83	70	49	77
1887	47	50	78	90	90	94	98	99	91	80	78	45	78
1888	50	56	69	85	79	95	102	97	93	82	79	65	79
1889	47	56	72	81	94	93	98	96	88	80	60	60	77
1890	56	60	56	86	88	93	98	99	93	75	74	67	79
1891	57	42	49	-----	89	90	86	94	92	86	65	61	-----
Means	50	56	66	81	87	93	97	96	91	82	68	56	77

Monthly absolute maximum temperatures, with monthly and annual averages, at stations in Nebraska.

HAY SPRINGS, NEBR.

1886	50	63	68	78	93	-----	100	98	92	83	54	50	-----
1887	50	57	75	85	86	92	99	98	87	85	70	46	78
1888	55	56	69	85	79	99	101	86	94	76	70	63	78
1889	49	56	67	78	82	93	104	98	95	84	64	64	78
1890	54	62	71	82	91	102	102	98	90	76	70	62	80
1891	47	49	58	87	90	89	90	97	94	76	78	55	76
Means	51	58	68	82	87	95	99	96	92	80	68	57	78

ROBINSON, FORT, NEBR.

1883	-----	-----	-----	-----	-----	-----	103	94	94	84	71	60	-----
1884	51	56	-----	76	88	97	101	97	94	82	73	-----	-----
1885	55	55	69	77	86	89	100	96	96	88	74	74	80
1886	56	71	73	76	95	92	104	103	89	88	72	57	81
1887	54	59	76	88	88	95	99	97	92	88	77	50	80
1888	-----	-----	-----	85	-----	-----	-----	-----	-----	-----	-----	-----	-----
1889	55	64	70	82	89	96	106	99	97	87	67	66	82
1890	63	72	70	81	90	99	102	100	93	80	74	68	89
1891	54	46	58	87	87	85	89	96	95	79	81	57	76
Means	56	60	69	81	89	93	100	98	94	84	74	62	80

VALENTINE, NEBR.

1885	-----	-----	-----	-----	-----	-----	-----	-----	94	88	69	68	-----
1886	57	66	74	78	95	91	103	98	93	81	59	61	80
1887	49	56	73	89	88	94	97	96	93	87	75	52	79
1888	63	62	67	88	77	100	103	92	99	-----	80	68	-----
1889	58	66	81	82	84	92	106	98	97	86	67	66	82
1890	59	66	69	83	91	98	103	98	92	80	75	68	82
1891	54	45	55	89	92	87	84	99	95	84	75	60	77
Means	57	60	70	85	88	94	99	97	95	84	71	63	80

Monthly absolute maximum temperatures, with monthly and annual averages, at stations in Minnesota.

MOORHEAD, MINN.

1881	34	33	40	73	88	86	95	92	83	69	48	43	65
1882	33	49	50	63	76	85	88	93	88	71	48	36	65
1883	37	40	44	74	72	100	91	87	87	64	55	55	67
1884	43	37	53	67	85	91	83	88	84	78	56	49	68
1885	43	50	49	67	85	86	92	91	92	84	46	43	69
1886	32	50	59	84	86	89	94	100	90	83	58	34	72
1887	30	39	46	86	95	95	95	84	84	74	71	36	69

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute maximum temperatures, with monthly and annual averages, at stations in Minnesota—Continued.

MOORHEAD, MINN.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1888	30	38	40	76	71	98	95	95	87	77	65	54	69
1889	46	39	68	82	87	90	93	96	94	78	59	41	73
1890	40	47	44	82	84	91	98	93	86	76	63	47	71
1891	42	37	48	91	91	95	83	96	92	79	62	47	72
Means	37	42	49	77	84	91	92	92	88	76	58	44	69

ST. VINCENT, MINN.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1880	35	33	49	73	85	83	92	88	80	77	49	37	64
1881	32	42	39	55	76	83	85	90	87	73	45	27	61
1882	22	35	42	67	74	93	93	82	89	69	57	42	64
1883	36	30	38	67	85	90	83	89	80	75	59	45	65
1884	39	38	42	65	85	84	91	86	82	70	40	39	64
1885	26	49	44	82	83	87	95	103	84	82	58	36	69
1886	23	28	45	83	96	93	89	88	85	71	69	43	68
1887	36	39	41	77	77	91	89	96	84	76	50	43	67
1888	48	38	69	83	80	92	94	95	94	77	58	40	72
1889	32	38	40	75	82	94	95	92	82	78	57	52	68
1890	41	31	46	90	92	90	81	88	88	71	63	46	69
1891	34	36	45	74	83	89	90	91	84	74	54	41	66
Means	34	36	45	74	83	89	90	91	84	74	54	41	66

APPENDIX No. 66.

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in North Dakota.

ABERCROMBIE, FORT, N. DAK.

[Letters prefixed to records indicate the number of days of observations missing, thus the letter *d* shows four days not recorded.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1860								53	33	20	-15	-15	
1861	-27	-40	-20	27	39	53	56	49	29	21	-13	-16	13
1862	-20	-36	-9	-7	36	43	55	47	32	10	-4	-16	10
1863	-20	-29	-18	18	43	47	54						
1864												-22	
1865	-23	-9	-27	-4	33	46		58	45	13	18	-24	
1866	-20	-35	-16		33				35	18	4	-24	
1867	-30	-30	-27	9	28	54	59	53	35	14	-13	-38	10
1868	-40	-40	-23	2	43	45	56	50	22	17	0	-27	9
1869	-30	-40	-40	25	40	40	50	52	32	7	-5		
1870	-35	-29	-18	9	36	39	44	32	32	19	10	-20	10
1871	-20	-20	-15	20	33	45	36	39	20	18	-22	-21	13
1872	-23	-27	-20	4	29	40	44	41	31	15	-16	-32	7
1873	-33	-22	-27	21	30	28	34	43	20	10	-7	-18	7
1874	-29	-22	-18	6	19	35	47	47	27	11	-15	-35	6
1875	-30	-27	-21	8	18	28	42	29	25	12	-25	-18	3
1876	-23	-23	-23	12	22	29	40	36	20	7	-28	-28	3
1877	-32	0	-11	5	38		42	38	30				
Means	-28	-27	-21	10	32	41	47	44	29	14	-9	-24	9

BATHGATE, N. DAK.

1891										20	-20	-23	
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BERTHOLD, FORT, N. DAK.

1866									32	14	10	-19	
1867	-20	-20	-13	25	33								

BISMARCK, N. DAK.

1874									26	6	-16	-29	
1875	-34	-31	-25	8	21	32	46	39	29	21	-28	-6	6
1876	-30	-28	-22	16	23	33	45	42	10	14	-15	-23	5
1877	-30	-5	-6	2	32	34	48	42	33	25	-6	2	14
1878	-19	9	20	27	27	46	47	44	20	6	19	-20	19
1879	-29	-26	-21	11	30	36	48	41	25	10	1	-38	7
1880	-21	-17	-16	7	37	40	44	44	29	12	-14	-28	10
1881	-34	-23	-7	1	28	48	46	49	29	17	-13	-8	11
1882	-22	-24	-20	17	24	37	47	43	32	25	2	-22	12
1883	-37	-29	-10	14	25	33	43	42	16	20	-14	-24	7
1884	-40	-29	-14	17	29	44	32	45	33	10	-10	-35	7
1885	-36	-28	-9	19	22	34	44	39	32	16	10	-11	11
1886	-37	-25	-13	9	30	41	51	34	22	19	-8	-34	7
1887	-44	-43	-16	12	26	38	50	37	28	2	-25	-25	3
1888	-37	-31	-20	6	20	31	49	36	29	20	0	-5	8
1889	-18	-34	4	20	22	42	48	44	26	23	-12	-6	13
1890	-35	-34	-24	19	27	46	44	40	26	22	8	-7	11
1891	-9	-23	-33	8	20	40	41	35	32	23	-11	-22	8
Means	-30	-25	-14	13	26	39	45	41	26	16	-7	-19	9

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

BUFORD, FORT, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1866									37	9		-24	
1867	-25	-29	-39	14	31	44		36	34	24	4	-17	
1868	-30	-23	10	22	40	51	58	47	19	20	-3	-26	15
1869	-8	-15	-18	9	31	35	40	38	27	4	-9	-19	10
1870	-35	-36	-19	13	34	35	45	31	8	11	16	-25	6
1871	-35	-31	5	18	37	40	40	34	30	9	-33	-35	7
1872	-36	-25	-13	18	28	32	37	29	21	11	-28	-35	3
1873	-36	-28	-8	5	23	48	47	35	16	5	-2	-27	6
1874	-28	-25	-22	7	25	40	37	44	24	5	-21	-29	5
1875	-33	-34	-20	4	26	30	40	37	26	21	-37	0	5
1876	-34	-33	-22	15	19	26	42	35	19	17	-15	-28	3
1877	-31	-11	-7	7	24	31	43	33	29	16	-13	-4	10
1878	-22	-8	12	18	23	39		44	20	10	4	-20	
1879	-17	-35	-22	24	30	38	44	41	26	11	0	-46	8
1880	-35	-22	-23	7	31	39	48	41	24	14	-18	-38	6
1881	-41	-24	3	8	28	45	43	43	28	9	-20	-20	8
1882	-27	-24	-19	20	22	38	43	37	31	23	-3	-24	10
1883	-46	-40	-7	12	22	30	40	36	18	14	-19	-34	2
1884	-41	-40	-23	12	25	44	38	44	28	14	-9	-40	4
1885	-46	-32	3	19	20	36	46	40	30	15	12	-10	11
1886	-48	-26	-10	11	30	36	50	34	20	22	-10	-33	6
1887	-46	-41	-10	12	32	39	45	44	31	0	-29	-25	4
1888	-49	-28	-28	4	22	36	49	36	25	22	1	-9	7
1889	-18	-32	-3	15	27	38	41	42	26	15	-28	-12	9
1890	-37	-43	-18	20	24	42	44	36	29	25	9	-2	11
1891	-10	-37	-30	10	14	36	40	35	32	15	-7	-17	7
Means	-33	-29	-13	13	27	38	44	38	25	14	-10	-23	8

CARRINGTON, N. DAK.

1889			-4	15	23	40	45	40					
1891							37	30	30		-26	-28	
Means							41	35					

CHURCH'S FERRY, N. DAK.

1891						37	38	28					
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DAVENPORT, N. DAK.

1890	-30	-25	-28	15	16	43	42	35	30	20			
1891					17	40	40	34					
Means					16	41	41	34					

DEVILS LAKE, N. DAK.

1884	-36	-33	-22	12									
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DICKINSON, N. DAK.

1891											-14	-8	
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ELLENDALE, N. DAK.

1890												-6	
1891	-10	-18	-21	19	30	44	50	25	32	26	-10		

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

FARGO, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891						41	41	31	29	22	-28	-17	.....

GALLATIN, N. DAK.

1889				16	28	40	46	42	28	18	-12	-12	.....
1890	-40	-42	-36	14	24	48	50	36	28	26	0	-22	7
1891	-20	-32	-32	0	20	40	44	28	28	24	-32	-32	3
Means	-30	-37	-34	10	24	42	47	35	28	23	-15	-22	6

GRAFTON, N. DAK.

1891	-24	-30			25	40	38	29	26	16	-21	-22	
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GRAND FORKS, N. DAK.

1890				18	16	41	47			28	0	-25	
1891	-19	-31				31		32	32		-18	-21	
Means						36					-9	-23	

GRAND RAPIDS, N. DAK.

1891							35	23	24	16	-30	-27	
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HOPE, N. DAK.

1891						39	40	31	30	24	9		
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KELSO, N. DAK.

1890							41	32	27	22	-1	-18	
1891	-16	-37	-25	10	19	40	38	30	28	20	-26	-20	5
Means							40	31	28	21	-14	-19	6

LAKOTA, N. DAK.

1891						36	38	30		19	-28	-30	
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LEECH FARM, N. DAK.

1888				24	21	31	48	64	34	25	17	-4	
1889	-30	-38	-2	21	21	36	40	38	31	19	-5	-7	10
1890	-30	-25	-28	15	16	43	42	35	30	20	.....	.....	.....
Means	-30	-32	-15	20	19	37	43	46	32	21	6	-6	12

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

LINCOLN, ABRAHAM, FORT, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1873							53	50	28	9	8	-16	
1874	-33	-18	-7	15	20	43	54	52	43	16	-12	-21	13
1875	-40	-27	-14	10	27	41	53	45	32	22	-23	-4	10
1876	-25	-30	-11	18	33	41	58	52	25	20	-9	-20	13
1877	-27	-7	-5	5	38	38	51	48	42	27	-9	1	17
1878	-15	10	22	32	28	54	54	52	30	6	20	-19	23
1879	-34	-30	-25		28	50	58	54	34	16	8	-43	
1880	-24	-16	-20	10	37	44	48		31	10	-19	-33	
1881	-36	-22	-10	1	32	47	45	48	30	17	-15	-12	10
1882	-24	-25	-21	15	22	37	46	41	30	22	-8	-30	9
1883	-46	-36	-12	13	26	37	43	42	16	17	-17	-31	4
1884	-45	-35	-18	15	29	42	42	42	30	10	-15	-43	4
1885	-42	-35	-15	16	22	46	50	38	30	13	8	-11	10
1886	-37	-27	-22	9	31	41	50	32	21	17	-11	-34	6
1887	-48	-44	-28	3	31	38	50	38	30	2	-24	-28	2
1888	-36	-33	-21	7	18	34	48	36	27	16	0	-6	8
1889	-19	-30	20	21	24	42	48	48	26	23	-12	-8	15
1890	-31	-34	-30	11	26	45	48	37	27	21	8	-8	10
1891	-9	-27	-30	8	20	41	48						
Means	-32	-26	-14	12	27	42	50	44	30	16	-7	-20	10

MINOT, N. DAK.

1891											11	-22	
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NAPOLEON, N. DAK.

1889						50	45	43	25	20	-7	-9	
1890	-30	-32	-24	14		39	38	32	22	17	2	-7	
1891	-14	-26	-20	4	18	38	39	32	28	21	-19	-25	6
Means	-22	-29	-22	9		42	41	36	25	19	-8	-14	

NEW ENGLAND CITY, N. DAK.

1888							42	39	17	13	-4	-8	
1889	-25	-33	0	19	20	34	37	37	25	12	-20	-14	8
1890	-36	-43	-19	15	16	34	38	33	20	20	5	-6	6
1891	-8	-32	-35						34				
Means	-23	-36	-18	17	18	34	39	33	24	15	-6	-9	7

PEMBINA, FORT, N. DAK.

1871									22	14	-33	-36	
1872	-28	-33	-23	-7	28	38	36	41	25	15	-28	-51	1
1873	-40	-31	-40	16	29	38	34	34	23	3	-25	-27	1
1874	-44	-32	-29	-4	26	33	41	41	23	5	-39	-42	-2
1875	-44	-45	-29	1	15	30	41	30	20	2	-36	-28	-4
1876	-37	-34	-27	2	17	30	40	32	20	6	-32	-43	-3
1877	-44	-24	-21	-14	26	32	43	35	23	19	-4	-4	6
1878	-25	-3	13	20	22	35	45	36	19	1	4	-29	11
1879	-30	-40	-26	-4	28	35	44		20	8	-9	-48	
1880	-32	-32	-30	0	33	35	41	38	28	13	-26	-37	3
1881	-42	-32	-15	-12	29	37	39	36	23	15	-21	-20	3
1882	-40	-34	-24	-6	23	36	42	44	23				
1883	-45		-33	-3	22	29	39	38	11	10	-23	-35	
1884	-35	-37	-26	9	29						-19	-47	
1885	-46	-34	-25	-12	22	34	38	27	25	18	3	-24	2

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

PEMBINA, FORT, N. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1886.....	—38	—38	—15	— 2	21	26	42	34	12	12	—20	—35	0
1887.....	—45	—40	—24	— 2	22	32	40	31	18	— 9	—29	—42	— 4
1888.....	—51	—48	—30	4	15	30	44	34	24	20	— 8	—14	2
1889.....	—27	—43	— 8	11	23	35	37	33	26	10	— 8	—20	6
1890.....	—37	—46	—30	10	12	36	38	30	26	23	— 2	—29	3
1891.....	—24	—29	—24	5	15	34	38	30	26	18	—24	—27	3
Means.....	—38	—34	—23	1	23	33	40	35	22	11	—19	—32	2

POWER, N. DAK.

1891.....						42	42	31	33	22	—21	—18	
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RANSOM, FORT, N. DAK.

1868.....												—17	
1869.....	—19	—19	—24	21	37	42	45	53	32	2	— 7	—17	12
1870.....	—25	—29	—13	11	40	43	53	39	39	19	8	—24	13
1871.....	—26	—24	— 5	21	36	51	53	48	31	10	—27	—27	12
1872.....	—29	—32	—21	16	29	40	40						.....
Means.....	—25	—26	—16	17	35	44	48	47	34	10	— 9	—21	12

RICE, FORT, N. DAK.

1868.....							60	48	12	25	5	—13	.....
1869.....	—12	—11	—12	15	40	44	50			— 1	— 8	—22	.....
1870.....	—24	—31	—14		30	46	49	39	38	25	18	—22	.....
1871.....	—22	—20	— 5	22	45	53	59	42	34	14	—28	—34	13
1872.....	—28	—31	—18	1	32	32	41	40	27	12	—10	—27	6
1873.....	—30	—19	— 7	24	38	48	43	39	23	12	— 3	—22	12
1874.....	—29	—23	— 7	9	34	44	50	50	32	5	—15	—27	9
1875.....	—33	—28	—23	10	20	41	56	51	29	24	—27	— 5	10
1876.....	—28	—23	—24	18	36	42	60	52	23	19	— 4	—20	13
1877.....	—20	4	— 4	10	46	44	58	52	40	28	— 8	— 7	20
1878.....	—29	8	19	27	29	43	44	43	20	— 6			.....
Means.....	—26	—17	—10	15	34	44	52	46	28	14	— 8	—20	13

RICHARDTON, N. DAK.

1884.....		—34	—16	13	30	52	50	49	32	8	—19	—36	.....
1885.....	—36	—23	— 6	20	20	40	46	42	34	22	10	—10	13
1886.....	—40	—22	—13	12	32	48	55	36		24	— 3	—35	.....
1887.....	—38		— 9			45		43		1	—30	—23	
Means.....	—38	—26	—11	15	27	46	50	42	33	14	—10	—26	10

ST. JOHNS, N. DAK.

1891.....									31	16	—17	—20	
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ST. THOMAS, N. DAK.

1891.....							36	29	26	18	—26	—25	
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute minimum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

SANBORN, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1890.....			-36										

SEWARD, FORT, N. DAK.

1873.....	-35	-30	-32	18	25	42	40	43	18	0	-10	-26	4
1874.....	-30	-25	-25	1	28	37	42	45	28	6	-16	-26	5
1875.....	-38	-34	-24	11	17	32	46	31	40	20	-28	-12	5
1876.....	-22	-20	-22	6	29	34	48	42	26	12	-24	-30	7
1877.....	-37	-12	-23	1	30	25	41	36	32				
Means.....	-32	-24	-25	7	26	34	43	39	29	10	-20	-24	5

SHEYENNE, N. DAK.

1872.....						44	54	p-50					
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SPIRITWOOD, N. DAK.

1881.....		-24	-3	-4	41								
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STEELE, N. DAK.

1889.....				10	15	37	40	39	22	16	-13	-11	
1890.....	-35	-41	-26	3	18	40	41	33	18	11	-2	-10	4
1891.....	-14	-28	-32	5	16	35	37	28	27	19			
Means.....	-24	-34	-29	6	16	34	26	33	22	15	-8	-10	4

STEVENSON, FORT, N. DAK.

1868.....	-24	-30	9	15	42	48	60	48	12	15	0	-20	15
1870.....	-32	-35	-12	10	40		52	40	34	16	16	-28	
1871.....	-35	-28	-2	20	45	51	53	39	27	10	-32	-37	9
1872.....	-29	-27	-20	9	31	37	38	38	26	12	-25	-35	5
1873.....	-35	-28	-30	12	25	41	41	38	16	4	-5	-27	4
1874.....	-29	-32	-24	3	32	38	41	44	27	11	-18	-27	6
1875.....	-37	-36	-30	7	25	22	46	38	26	20	-29	-12	5
1876.....	-31	-30	-24	12	22	32	45	39	15	11	-22	-32	3
1877.....	-41	-13	-14	2	30		j 40	35	28	16	-11	-7	
1878.....	-32	3	12	21	24	43	48		16	8	8	-34	
1879.....	-38	-33	-26	14	30	44	48	40	22	13	-12	-54	4
1880.....		-29	-28	-2	48	36	42	38	20	4	-28	-45	
1881.....	-55	-40	-23	-15	24	38	44	45	27	13	-22	-13	2
1882.....	-30	-37	-30	14	24	33	45	34	29	22	-5	-34	5
1883.....	47	-37	-17	-7									
Means.....	-35	-29	-17	8	32	39	46	40	23	12	-13	-29	6

TOBACCO GARDEN, N. DAK.

1882.....		-35	-14	14	22	33	41	32	23	21	-5	-35	
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

TOTTEN, FORT, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1869.....								50	29	3	—10	—32	.....
1870.....	—31	—38	—15	8	38	40	50	43	40	19	6	—26	11
1871.....	—34	—34	—8	20	34	50	51	44	30	16	—29	—32	9
1872.....	—31	—27	—22	13	26	42	40	43	26	15	—21	—36	6
1873.....	—31	—30	—23	16	26	44	43	42	25	2	—10	—26	6
1874.....	—33	—25	—19	0	29	35	48	47	31	12	—20	—29	6
1875.....	—40	—34	—20	6	23	36	48	38	32	12	—28	—18	5
1876.....	—27	—27	—15	12	24	34	48	38	27	15	—24	—25	7
1877.....	—35	—12	—20	10	29	31	45	41	32	21	—5	—3	11
1878.....	—23	6	17	29	26	45	53	45	19	9	10	—26	18
1879.....	—34	—35	—22	5	30	35	45	45	26	9	—6	—51	4
1880.....	—42	—25	—28	8	35	47	45	46	31	10	—20	—38	6
1881.....	—42	—25	—8	1	25	45	52	47	45	14	—18	—12	10
1882.....	—31	—25	—20	2	25	40	45	44	28	23	—2	—29	8
1883.....	—44	—40	—19	1	24	34	45	43	12	16	—16	—31	2
1884.....	—39	—31	—21	10	29	46	43	44	34	12	—22	—35	6
1885.....	—37	—34	—20	14	20	35	43	35	29	19	3	—20	7
1886.....	—43	—38	—16	—2	28	33	42	29	17	20	—13	—33	2
1887.....	—39	—36	—23	1	29	35	44	37	25	8	—23	—35	2
1888.....	—41	—41	—22	—1	22	30	46	35	29	19	—30	—5	3
1889.....	—25	—36	—3	19	29	42	37	46	29	21	—8	—11	12
1890.....	—36	—37	—26	7	21	42	46	39	30	25	5		
Means.....	—35	—30	—17	9	27	39	46	42	28	14	—13	—26	7

VALLEY CITY, N. DAK.

1891.....									25	16	—28	—24	
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WAHPETON, N. DAK.

1889.....							40	38	31	19	—4	—4	
1890.....	—31	—26	—26	22	19	42	44	32	26	25	2	—12	10
1891.....	—11	—39	—36	18	21	41	41	32	32	21	—24	—21	6
Means.....	—21	—32	—31	20	20	42	42	34	30	22	—9	—12	9

WILD RICE, N. DAK.

1890.....						51	57	50	32	30	2	—16	
1891.....	—15	—26	—24	13	29								

WILLOW CITY, N. DAK.

1891.....								24	19	16	—31	—41	
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WOODBIDGE, N. DAK.

1891.....										17	—35	—37	
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YATES, FORT, N. DAK.

1882.....	—28	—30	—20	21	18	34	46	40	30	20	—2	—24	9
1883.....	—41	—39	—10	17	25	33	42	42	25	11	—10	—31	5
1884.....	—44	—38	—14	19	34	48	42	45	29	11	—21	—37	6
1885.....	—34	—32	—10	20	24	33	38	41	30	8	8	—15	9

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute minimum temperatures, with monthly and annual averages, at stations in North Dakota—Continued.

YATES, FORT, N. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1886.....	-39	-24	-20	10	32	41	50	27	20	10	-21	-44	4
1887.....	-50	-33	-8	12	30	39	38	43	.....	1	-24	-25	.....
1888.....	-32	-22	-18	12	24	35	51	43	25	21	3	-6	11
1889.....	-17	-26	5	26	23	39	38	41	28	23	-9	-5	14
1890.....	-30	-28	-19	15	27	47	50	40	27	21	5	-10	12
1891.....	-5	-20	-30	9	23	42	41	35	35	26	-7	-16	11
Means.....	-32	-29	-14	16	26	39	44	40	28	15	-6	-21	9

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in South Dakota.

ABERDEEN, S. DAK.

1890.....	.....	.....	-20	10	15	30	36	35	20	12	1	-5	.....
1891.....	-2	-25	-26	8	21	40	39	28	18	23	-21	-21	8
Means.....	.....	.....	-23	9	18	35	38	32	24	18	-10	-13	.....

ALEXANDRIA, S. DAK.

1882.....	.....	.....	-6	26	35	.....	.....	.....	.....	.....	.....	.....	.....
1889.....	.....	.....	.....	.....	.....	.....	42	42	32	.....	0	-9	.....
1890.....	-24	-25	-14	20	23	45	46	37	26	15	-1	-14	11
1891.....	-4	-21	-24	12	31	45	42	31	30			-16	
Means.....	-14	-23	-15	19	30	45	43	37	29		-0.5	-13	

ARMOUR, S. DAK.

1889.....					39	47	52	52			2	13	
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BANGOR, S. DAK.

1891.....						40							
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BENNETT, FORT, S. DAK.

1881.....							50	49	34	24	-3	4	
1882.....	-18	-18	-6	27	31	33	46	43	28	20	9	-19	15
1883.....	-42	-31	-1	22	30	37	47	42	27	20	-4	-19	11
1884.....	-31	-32	-11	19	32	43	.....	.....	.....	.....	.....	.....	.....
1885.....	-40	-27	4	19	25	38	48	46	39	18	16	.....	.....
1890.....	-25	-28	-13	12	24	42	45	41	30	16	0	-9	11
1891.....	1	-25	-28	14	26	43	45	36	35	23			
Means.....	-26	-27	-9	19	28	39	45	43	32	20	4	-11	13

BRITTON, S. DAK.

1891.....									31	21	-27	-22	
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

BROOKINGS, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1888.....						33	38	40	23	21	20	— 5	-----
1889.....	—24	—30	4	12	20	36	37	41	30	24	— 6	—21	10
1890.....	—28	—35	—28	10	23	39	41	35	25	28	0	—20	8
1891.....	—10	—28	—24	11	30	38	39	30	24	20	—29	—21	7
Means.....	—21	—31	—16	11	24	36	39	36	25	23	— 4	—17	9

CANTON, S. DAK.

1889.....								49	35	27	0	0	-----
1890.....	—24	—23	—12	15	23	47	49	39	30	25	7	—12	14
1891.....	0	—20	—20	13	34	45							-----
Means.....	—12	—22	—16	14	28	46		44	32	26	4	— 6	-----

CASTLEWOOD, S. DAK.

1891.....								25	24	14	—34	—24	-----
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CLARK, S. DAK.

1889.....							39	46	31	19	— 5	—16	-----
1890.....	—28	—20	—16	14	24	43	41	35	22	19	4	—20	10
1891.....	— 8	—21	—22	8	28	44	41	32	33	22	—23	—21	9
Means.....	—18	—20	—19	11	26	43	40	36	30	20	— 8	—19	10

CROSS, S. DAK.

1890.....			— 4	14	32	40		38	28		16		-----
1891.....		—32	—22		26	44	42	34	32	16	— 3	— 3	-----
Means.....			—13		29	42		36	30		6		-----

DAKOTA CITY, S. DAK.

1886.....					38								-----
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DAKOTA, FORT, S. DAK.

1866.....									31				-----
1868.....									27	22	4	—19	-----
1869.....	—14	—17	—17	18	41								-----
Means.....									29				-----

DEADWOOD, S. DAK.

1878.....	— 8	11	10	26	30						3	—25	-----
1879.....	—24	—12	— 5	20	29	37	44	43	30		3	—16	-----
1880.....	— 7	—23		11	27	33	42	41	29	5	—16	—20	-----
1881.....	—22	—20	0	11	31	42	44	43	29	17	— 2	6	15
1882.....	—11	—13	— 1	14	30	41	43	40	32	27	3	—13	16

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute minimum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

DEADWOOD, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1883.....	-30	-32	7	17	21	38	42	42	31	22	7	- 8	13
1884.....	-14	-27	- 7	13	28	43	45	40	28	26	- 4	-28	12
1885.....	-15	-15	7	21	17	35	45	39	35	18	15	- 2	17
1886.....	-24	- 3	6	15	26	40	48	38	35	25	- 5	-15	16
1887.....	-18	-29	10	16	31	40	45	41	33	7	-11	-11	13
Means.....	-17	-16	3	16	27	39	44	41	31	18	- 0.7	-13	14

DE SMET, S. DAK.

1890.....	-25	-17	-11	27	33	52	58	53	40	27	11	-13	20
1891.....	- 3	-19	- 5	17									
Means.....	-14	-18	- 8	22									

ELKTON, S. DAK.

1891.....	0	-22	-12		27	37	34	34	28	20	-28	-20	
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EGELAND, S. DAK.

1891.....					22	40							
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FLANDREAU, S. DAK.

1890.....	-24	-26	-15	10	20	43	43	37	26	12	4	-19	9
1891.....	- 8	-27	-22	8	27	39	34	31	27	19	-29	-21	6
Means.....	-16	-26	-18	9	23	41	38	34	26	15	-12	-20	8

FORESTBURG, S. DAK.

1891.....					32	45	44	32	29	20	-13	-16	
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FOREST CITY, S. DAK.

1891.....							52	41	38	20	-12		
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FRANKFORT, S. DAK.

1891.....									28	21	-24	-24	
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GARDEN CITY, S. DAK.

1887.....												-24	
1888.....	-35	-31	-15	13									

GARY, S. DAK.

1891.....								36	34	21	-22	-15	
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CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

GODDARD, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1888.....		-11		24	30	40	58	52	31	18	0	0	
1889.....	2												

GRAND VIEW, S. DAK.

1888.....										27	16	18	
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HALE, FORT, S. DAK.

1879.....	-35	-18	-5	8	32	34	52	45	33	5	-2	-40	9
1880.....	-8	-22	-28	8	37	46	47	43	26	15	-15	-20	11
1881.....	-41	-33	-12	-1	41	50	50	54	34	18	-8	3	13
1882.....	-19	-14	-6	25	31	37	49	43	31	23	3	-23	15
1883.....	-39	-36	0	21	36	40	48	45	29	17	3	-22	12
1884.....	-32	-34	-15	21	32								
Means.....	-29	-26	-11	14	35	41	49	46	31	16	-4	-20	12

HENRY, S. DAK.

1886.....										24	-5	-22	
1887.....	-28	-28	-13	13	29	36	51	37	28				

HIGHMORE, S. DAK.

1888.....		-29	-17				51	42					
1890.....		-17	13	27	36		43	34	28	19	0	-9	
1891.....	-10	-20	-17	8									
Means.....		-24	-17	10			47	38					

HOWARD, S. DAK.

1890.....							35	23	10	9	-20		
1891.....	-5	-24	-26		29	42	37	30	28	23	-25	-20	
Means.....							32	26	16	-8	-20		

HURLEY, S. DAK.

1888.....	30												
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HURON, S. DAK.

1881.....							54	49	34	21	-6	-3	
1882.....	-16	-18	-6	19	28	37	47	43	30	25	3	-20	14
1883.....	-30	-32	-8	24	32	34	46	43	28	22	-4	-20	11
1884.....	-38	-32	-15	22	30	43	49	43	36	22	-13	-34	9
1885.....	-33	-24	-3	18	25	38	45	47	31	21	8	-11	14
1886.....	-32	-27	-6	9	32	39	55	33	28	20	-5	-32	10
1887.....	-43	-30	-4	16	32	38	44	40	26	5	-28	-23	6
1888.....	-36	-32	-14	20	24	36	48	42	29	17	3	-7	11
1889.....	-25	-30	8	21	22	40	44	46	32	17	-4	-12	13
1890.....	-28	-24	-15	17	23	45	47	35	25	14	0	-16	10
1891.....	-8	-22	-24	11	29	43	41	34	30	20	-18	-20	10
Means.....	-29	-27	-9	18	28	39	47	42	30	19	-6	-18	11

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute minimum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

KIMBALL, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1889.....						41	47	48	34	19	— 4	— 5	.....
1890.....	—24	—27	—10	18	25	44	51	39	28	19	2	— 3	14
1891.....	— 7	—18	—17	11	28	44	44	33	31	22	—13	—14	12
Means	—16	—22	—14	14	26	43	47	40	31	20	— 5	— 7	13

LEAD CITY, S. DAK.

1878.....						38	41	46	27	6			
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LOWER BRULE AGENCY, S. DAK.

1875.....									30	19	—13	— 5	
1876.....	—22	—28	—14	23	28	31	44	50	25	18	— 4	—21	11
1877.....	—25	1	—18	16	33	33	43	44	33	21	— 6	— 3	14
1878.....	—12	3	25	28	30	44	52	48	25	8	13	—18	20
Means	—20	— 8	— 2	22	30	36	46	47	28	16	— 2	—12	15

MEADE, FORT, S. DAK.

1879.....							48	45	34	5	— 3	—25	.....
1880.....	—10	—29	—22	19		32	43	39	33	11	—17	—24	.....
1881.....	—24	—25	5	8	32	44	47	50	31	12	— 9	5	15
1882.....	—14	—18	1	18	25	39	40	40	31	21	— 3	—18	14
1883.....	—34	—34	4	8	20	37	35	38	27	14	7	—11	9
1884.....	—21	—28	—11	12	25	38	40	34	20	13	—12	—32	6
1885.....	—27	—19	— 1	25	20	37	45	40	37	22	20	— 2	16
1886.....	—33	—16	— 7	12	26	45	55	32	33	21	—13	—24	11
1887.....	—33	—37	— 2	13	27	38	48	41	34	1	—25	—32	6
1888.....	—31	—10	—17	21	23	35	54	40	35	15	— 8	0	13
1889.....	— 3	—20	5	20	29	42	34	47	28	22	— 4	— 2	16
1890.....	—26	—29	— 1	6	27	43	51	48	28	27	10	— 5	15
1891.....	— 4	—33	—22	17	20	41	43	40	37	21	— 4	— 3	13
Means	—22	—25	— 6	15	27	39	45	41	31	16	— 5	—13	12

MILLBANK, S. DAK.

1890.....	—31			22	30	54	50	48	35	29	6	— 7	.....
1891.....	—12	—19	—18	20	34	44	50	50	34	20	—20	—14	14
Means	—22			21	32	49	50	49	34	24	— 7	—10	

MITCHELL, S. DAK.

1891.....							44	33	34	18	—12	—14	
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MORRISTON, S. DAK.

1878.....	—24	—16	— 3	20	38	50	60	60	42	18	1	—12	
1879.....	— 5	—14	—14	12	48	52	57	53			— 8	—20	18
1880.....	—33	—25	— 3	— 1	42	60	65	60	40	26	— 1	0	19
1881.....	—10	—16	2	32	40	46	60	50	37	25	6	—20	21
1882.....	—30	—30	0	26	33	48	50	42	28				.....
1883.....													.....
1884.....			—10	26	30	50	50						.....
Means	—20	—20	— 5	19	38	51	57	57	37	23	— 0.5	—16	18

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

OELRICHS, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1890.....	-----	-----	-12	11	24	-----	39	39	25	16	10	0	-----
1891.....	-23	-23	-28	12	24	40	39	35	28	11	-10	-10	8
Means.....	-----	-----	-20	12	24	-----	39	37	26	14	0	-5	-----

OLIVET, S. DAK.

1877.....	-----	-----	-----	-----	-----	46	53	57	44	23	15	0	-----
1878.....	-10	6	14	32	40	54	62	59	36	14	10	-15	25
1879.....	-29	-16	0	9	40	45	61	48	40	6	-6	25	14
1880.....	-4	-20	-14	18	48	52	55	49	40	10	-10	-17	17
1881.....	-36	-20	-5	2	43	52	60	60	40	25	-2	0	18
1882.....	-18	-14	1	28	37	48	56	50	36	23	6	-----	-----
Means.....	-19	-13	-0.8	18	42	49	58	54	39	16	2	-11	20

ONEIDA, S. DAK.

1890.....	-20	-28	2	19	22	-----	53	40	24	19	4	-----	-----
1891.....	-7	-20	-20	15	28	42	40	35	34	22	-13	-11	12
Means.....	-14	-24	-9	17	25	-----	46	38	29	20	-4	-----	-----

PARKER, S. DAK.

1891.....	-----	-----	-----	-----	-----	-----	40	36	27	-----	0	-15	-----
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PARKSTON, S. DAK.

1887.....	-----	-22	-10	16	45	40	52	66	60	10	-27	-22	-----
1888.....	-28	-20	-12	20	30	40	56	65	-----	-----	2	-2	-----
1889.....	-22	-28	10	-----	-----	40	48	50	31	17	-----	-2	-----
1890.....	-26	-29	-12	18	28	46	45	-----	-----	-----	-----	-4	-----
1891.....	0	-16	-16	18	34	50	55	42	34	24	0	-12	18
Means.....	-19	-23	-8	18	34	43	51	56	42	17	-8	-8	16

PIERRE, S. DAK.

1891.....	-----	-----	-----	-----	-----	-----	46	42	38	27	-8	-11	-----
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PLANKINTON, S. DAK.

1891.....	-----	-----	-----	-----	-----	45	48	35	-----	-----	-----	-----	-----
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RANDALL, FORT, S. DAK.

1860.....	-----	-6	-18	-----	42	58	56	48	40	22	-4	-22	-----
1861.....	-17	-11	-6	32	36	60	62	56	34	26	-3	-3	23
1862.....	-22	-10	10	15	40	52	62	58	42	10	10	1	22
1863.....	-11	-17	5	24	41	53	54	34	34	5	-14	-27	15
1864.....	-27	-6	4	29	-----	52	58	56	40	-----	1	-26	-----
1865.....	-11	4	-19	14	30	-----	-----	-----	45	11	-----	-----	-----
1866.....	-----	-----	-----	-----	-----	-----	-----	-----	37	22	-9	-17	-----

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Monthly absolute minimum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

RANDALL, FORT, S. DAK.—Continued.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1867.....	-15	-21	-15	19	37	52	61	55				-5	
1868.....	-20	-21	12	20	49	51	65	51	33	26	12	7	24
1869.....	5	1	1	12	41	52	56		36	4	4	-7	
1870.....	-17	-12	-7	14	37	37	46	40	40	20	12	-18	16
1871.....	-11	-23	5	26		46	51	43	19	16	-14	-17	
1872.....	-21	-12	3	20	31	48	48	50	35	20	-13	-30	15
1873.....	-32	-30	-10	0	18	53	42	54	22	6	2	-25	8
1874.....	-28	-18	-5	11	10	43	52	50	30	10	-5	-25	10
1875.....	-44	-39	-28	8	21	36	48	42	27	15	-25	-22	3
1876.....	-28	-17	-20	7	27	30	47	49	18	16	-24	-33	6
1877.....	-27	0	-16	12	36	43	42	44	29	17	-14	-5	13
1878.....	-22	-8	15	24	28	41	45	48	24	10	-8	-27	14
1879.....	-38	-25	-5	12	48	39	55	46	28	9	-4	-32	11
1880.....	-4	-14	-20	12	39	47	42	39	28	11	-11	-17	12
1881.....	-35	-29	-6	2	38	49	53	50	33	21	-6	-4	14
1882.....	-8	-8	-1	25	33	41	49	41	30	22	6	-20	18
1883.....	-30	-32	1	27	29	36	45	40	32	19	-1	-18	12
1884.....	-29	-29	-12	22	33	40	47	44	36	18	-4	-31	11
1885.....	-33	-25	0	18	25	38	43	39	33	20	9	-15	12
1886.....	-29	-21	-5	4	32	37	40	30	23	15	1	-25	8
1887.....	-33	-22	1	24	39	44	54	49	18	14	-41	-16	11
1888.....	-30	-20	-17	24	29	41	50	42	25	20	4	4	14
1889.....	-15	-13	12	27	30	45	48	49	32	18	-3	-3	19
1890.....	-24	-23	-3	20	27	49	50	42	30	18	10	-6	16
1891.....	2	-13	-20	15	32	48	43	35	32	23	-3	-11	15
Means.....	-22	-17	-5	17	33	45	50	49	33	16	-4	-16	15

RAPID CITY, S. DAK.

1881.....		-30	10	10	29	44	37	50	30	15	2	3	
1882.....	-16	-21	-2	13	27	36	45	42	36	22	-2	-25	13
1883.....	-37	-40	6	2	20	35							
1884.....	-30	-3	-16	20	22	40	51	42	35	21	10	-4	16
1885.....	-3	-17	10	21	31	43	46	49	30	25	0	-2	19
1886.....	-24	-27	-3	8	25	45	55	46	32	25	13	3	16
1887.....	2	-22	-17	19	23	42	47	42	38	22	-3	-3	
Means.....	-18	-23	-2	13	27	41	46	45	34	22	3	-5	15

REDFIELD, S. DAK.

1889.....				20	24	41							
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ROSCOE, S. DAK.

1889.....					28	39	42	41	26	18			
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ST. LAWRENCE, S. DAK.

1890.....								52	32	28		-9	
1891.....	-7	-20	-19	16	32	46	54	42			-6	-10	
Means.....								47				-10	

SCRANTON, S. DAK.

1890.....	-23	-33	-12	30	33	54	59	51	32	28	6	-7	18
1891.....	-6	-26	-18	12									
Means.....	-14	-30	-15	21									

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

SIOUX FALLS, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1890.....						52	54	36	34	22	0	—17	.....
1891.....	— 4	—26	—18	14	.....	.....	50	29	28	18	—24	—22	.....
Means .....						.....	52	32	31	20	—12	—20	.....

SISSETON, FORT, S. DAK.

1867	-27	-24	-24	7	30	48	57	---	36	24	4	---	---
1868	-12	---	---	---	---	---	---	---	---	---	---	---	---
1869	---	-19	-24	21	35	42	53	55	31	5	-5	-17	---
1870	-25	-30	-19	9	39	42	54	40	41	22	11	-28	1
1871	-24	-23	2	18	34	49	51	49	34	16	-24	-30	13
1872	-29	-26	-20	4	29	41	43	44	29	15	-20	-35	8
1873	-32	-32	-22	15	28	48	47	48	22	-9	-7	-23	6
1874	-28	-25	-12	4	31	37	46	51	32	6	-11	-23	9
1875	-37	-33	-18	5	22	31	48	45	28	5	-25	-22	4
1876	-27	-20	-18	14	24	34	40	32	19	10	---	-28	---
1877	-29	-10	-15	6	30	---	---	42	---	---	---	---	---
1878	-25	---	9	25	30	45	51	---	---	8	---	-25	---
1879	-34	-32	-21	3	33	---	49	---	---	6	-8	-40	---
1880	-24	-16	-20	---	---	40	45	41	27	9	-20	-45	---
1881	-32	---	-9	-2	26	46	51	48	30	20	-15	-11	---
1882	-26	-23	-14	6	25	37	49	41	28	17	-7	-30	9
1883	-41	-38	-19	15	25	35	40	40	19	15	-15	-27	4
1884	-44	-29	-23	16	27	44	44	41	32	12	-22	-38	5
1885	-37	-36	-16	11	20	32	40	33	27	12	5	-19	6
1886	-44	-36	-12	4	28	36	50	29	17	19	-17	-37	3
1887	-40	-38	-2	2	27	33	41	33	28	-6	-24	-30	2
1888	-38	-35	-15	2	14	39	49	40	32	24	4	-3	9
1889	-25	-30	-3	17	---	---	---	---	---	---	---	---	---
Means	-31	-28	-14	10	28	40	47	42	28	11	-11	-27	8

SMITHVILLE, S. DAK.

1881.....							51	53	35	20	0	1	
1882.....	—21	—23	—12	24	41	36							

SPEARFISH, S. DAK.

1890.....	-20	-23	3	20	28	44	61	47	33	29	18	4	20
1891.....	1	-28	-20	17	24	39	43	40	39	23	-2	0	15
Means	-10	-26	-8	18	26	42	52	44	36	26	8	2	18

SPRING LAKE, S. DAK.

1888.....	-14	-18	10	32	40	54	50	62	-----	12	12	-----
1889.....									-----			-----

SULLY, FORT, S. DAK.

1866	-19	-18	0	19														
1868																		
1869	-9	-5	-10	24	30	37	46	49	33	-3	7	-11						
1870	-28	-20	-12	8	19	38	50	36	34	23	2	-10						15
1871	-30	-26	1	0	35	40	48	41	24	15	-11	-19						12
1872	-22	-14	-5	7	32	42	42	47	32	20	-12	-26						10
1873	-25	-22	-11	15	32	48	50	50	24	5	0	-27						12
1874	-13	-10	2	15	34	39	55	53	38	11	-7	-13						17
1875	-32	-30	-14	11	24	38	49	48	29	23	-13	0						1

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SULLY, FORT, S. DAK.—Continued.

TYNDALL, S. DAK.

VERMILLION, S. DAK.WATERTOWN, S. DAK.

WEBSTER, S. DAK.

WENTWORTH, S. DAK.[illegible]

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in South Dakota—Continued.

WESSINGTON SPRINGS, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1891.....							44	35	36	24	-13	-14	-----

WICKLOW, S. DAK.

1883.....	-24	-28	-----	26	-----	-----	53	48	30	-----	-----	-18	-----
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WOLSEY, S. DAK.

1889.....	-31	-34	7	20	20	38	44	43	27	2	-10	-15	9
1889.....	-29	-28	-16	13	19	50	59	34	26	15	-2	-11	11
1891.....	-7	-25	-23	11	33	47	54	35	39	22	-18	-21	12
Means	-22	-29	-11	15	24	45	52	37	31	13	-10	-16	11

WOONSOCKET, S. DAK.

1888.....				16	23	36	45	37	27	16	-1	-9	-----
1889.....	-29	-30	8	18	22	39	41	66	28	14	-4	-13	13
1890.....	-28	-29	-16	16	23	42	46	32	24	12	-6	-21	8
Means	-28	-30	-4	17	23	39	44	45	26	14	-4	-14	11

YANKTON, S. DAK.

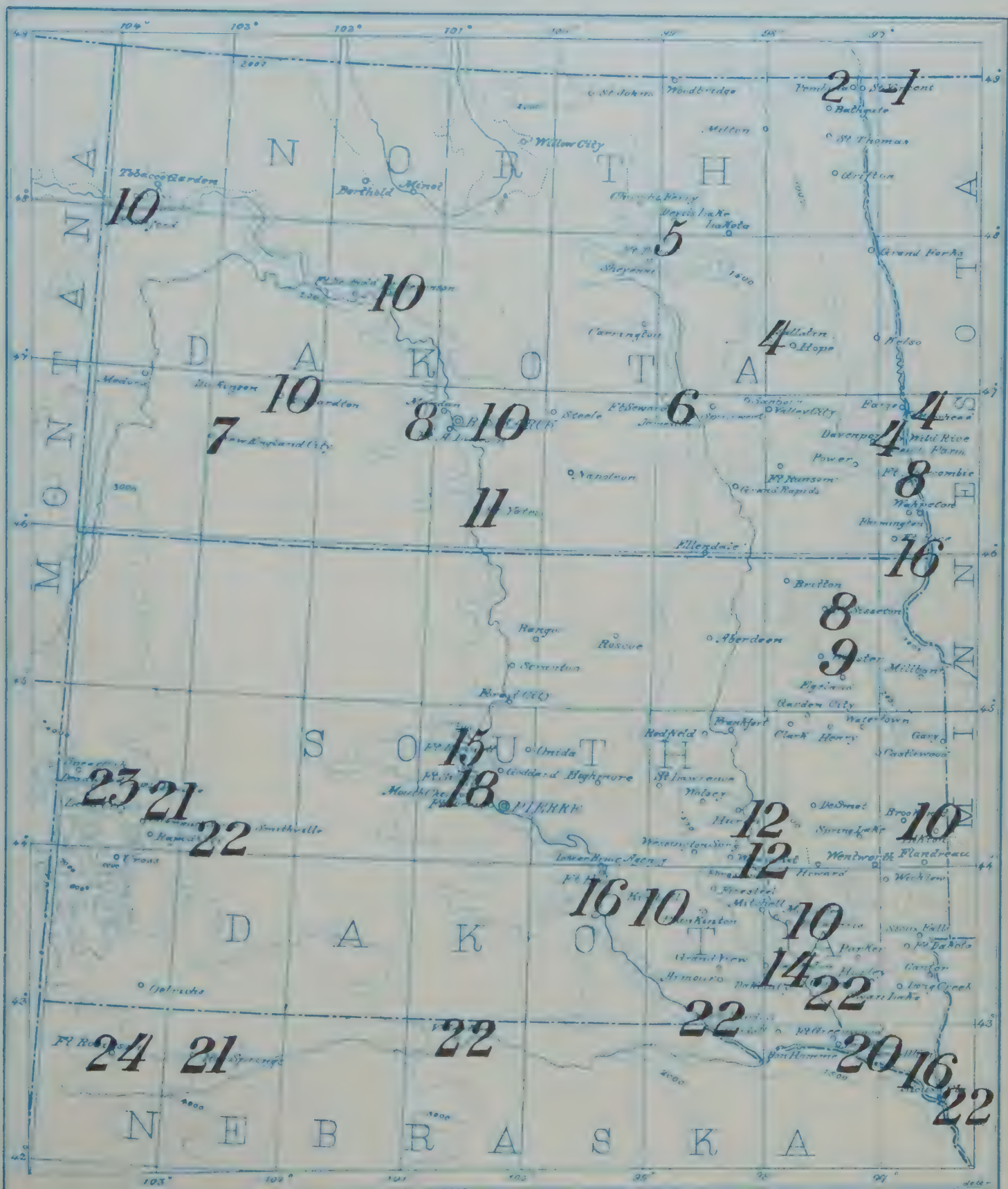
1873.....				20	23	49	51	59	30	11	10	-10	-----
1874.....	-20	-4	7	16	35	44	54	50	30	16	0	-14	18
1875.....	-25	-22	-12	17	24	42	52	45	31	18	-15	-15	12
1876.....	-17	-18	-16	21	34	38	51	46	26	16	-7	-18	13
1877.....	-19	5	-14	14	31	38	44	46	38	25	-5	-1	17
1878.....	-10	3	21	27	28	47	56	48	28	9	15	-11	22
1879.....	-30	-17	-3	7	29	38	53	51	32	13	1	-34	12
1880.....	-2	-9	-16	20	43	47	47	46	37	15	-5	-19	17
1881.....	-32	-23	-8	3	38	53	54	52	36	24	-1	4	16
1882.....	-6	7	0	29	35	42	48	48	32	30	12	-16	21
1883.....	-22	-4	4	27	28	39	52	48	37	21	3	-13	18
1884.....	-28	-23	-11	27	34	47	56	48	39	25	-3	-23	16
1885.....	-24	-18	2	19	26	43	48	46	38	26	18	-10	18
1886.....	-28	-25	-6	4	39	44	56	41	34	20	0	-23	13
1887.....	-29	-22	-2	19	36	45	53	44	35	13	-18	-16	13
1888.....	-28	-19	-18	24	32	43	54	44	35	24	9	6	17
1889.....	-12	-18	13	27	30	44	50	51	34	22	0	3	20
1890.....	-22	-17	-7	15	32	50	51	41	33	22	9	-7	17
1891.....	1	-19	-17	-----	32	49	46	-----	38	26	-8	-6	-----
Means	-20	-14	-5	18	32	44	51	47	34	20	1	-12	16

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in Minnesota.

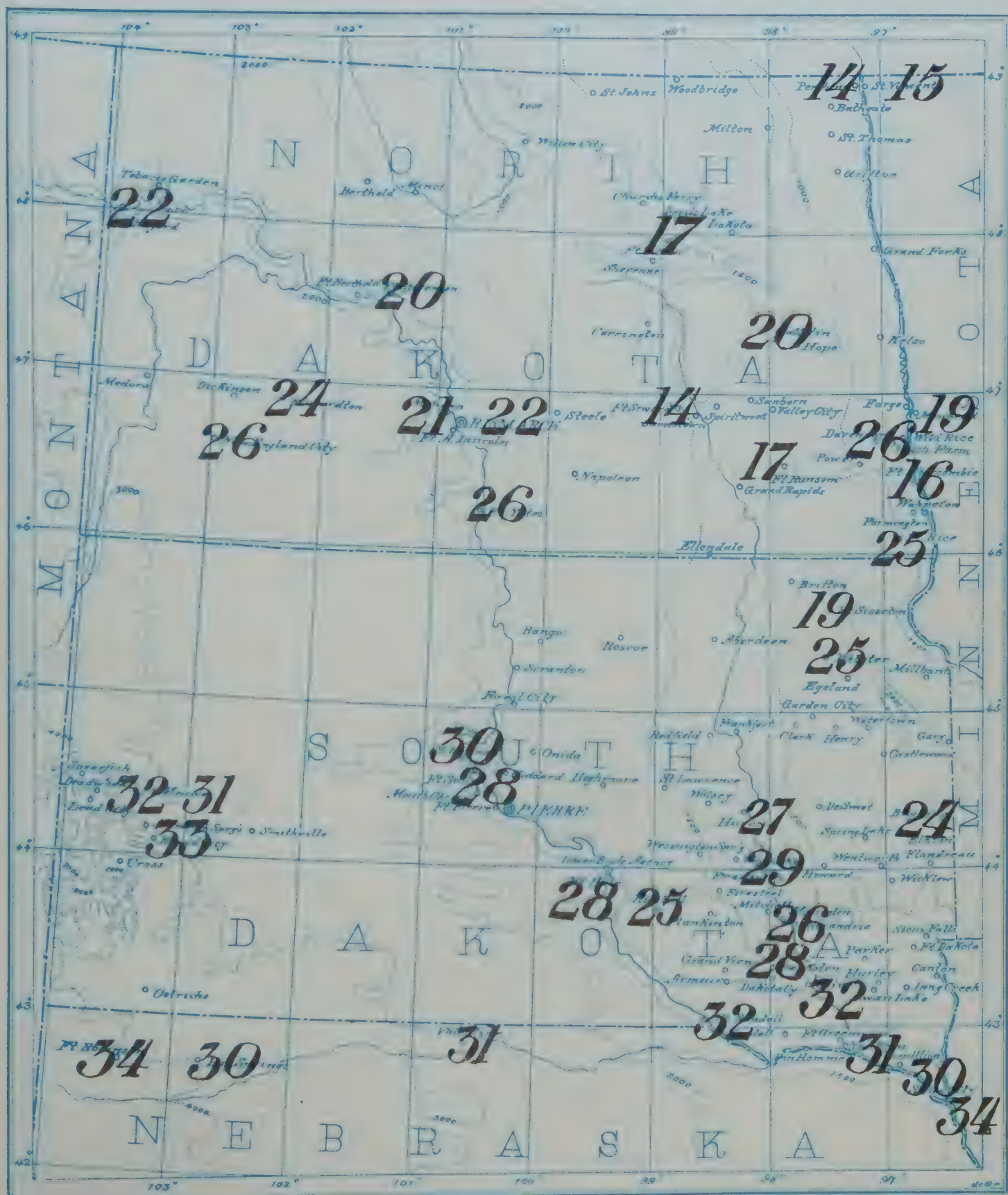
MOORHEAD, MINN.

1881.....	-36	-33	-7	-13	29	46	47	45	30	17	-15	-9	8
1882.....	-36	-19	-20	7	26	35	45	38	24	25	-7	-29	7
1883.....	-42	-33	-22	6	33	32	43	39	17	15	-14	-34	3
1884.....	-43	-30	-23	17	28	39	43	42	36	15	-15	-31	6
1885.....	-35	-30	-15	14	21	30	43	32	26	18	5	-20	7
1886.....	-36	-37	-6	4	27	33	47	32	23	10	-22	-35	3
1887.....	-47	-35	-19	4	25	36	42	37	23	6	-22	-36	1
1888.....	-44	-47	-20	7	20	28	47	33	26	20	-3	-5	5
1889.....	-29	-35	-2	20	20	35	39	38	29	18	-5	-8	10
1890.....	-31	-26	-22	10	14	44	46	36	30	24	2	-18	9
1891.....	-17	-35	-23	11	22	40	42	34	32	24	-24	-20	7
Means	-36	-33	-16	8	24	36	44	37	27	17	-11	-22	6

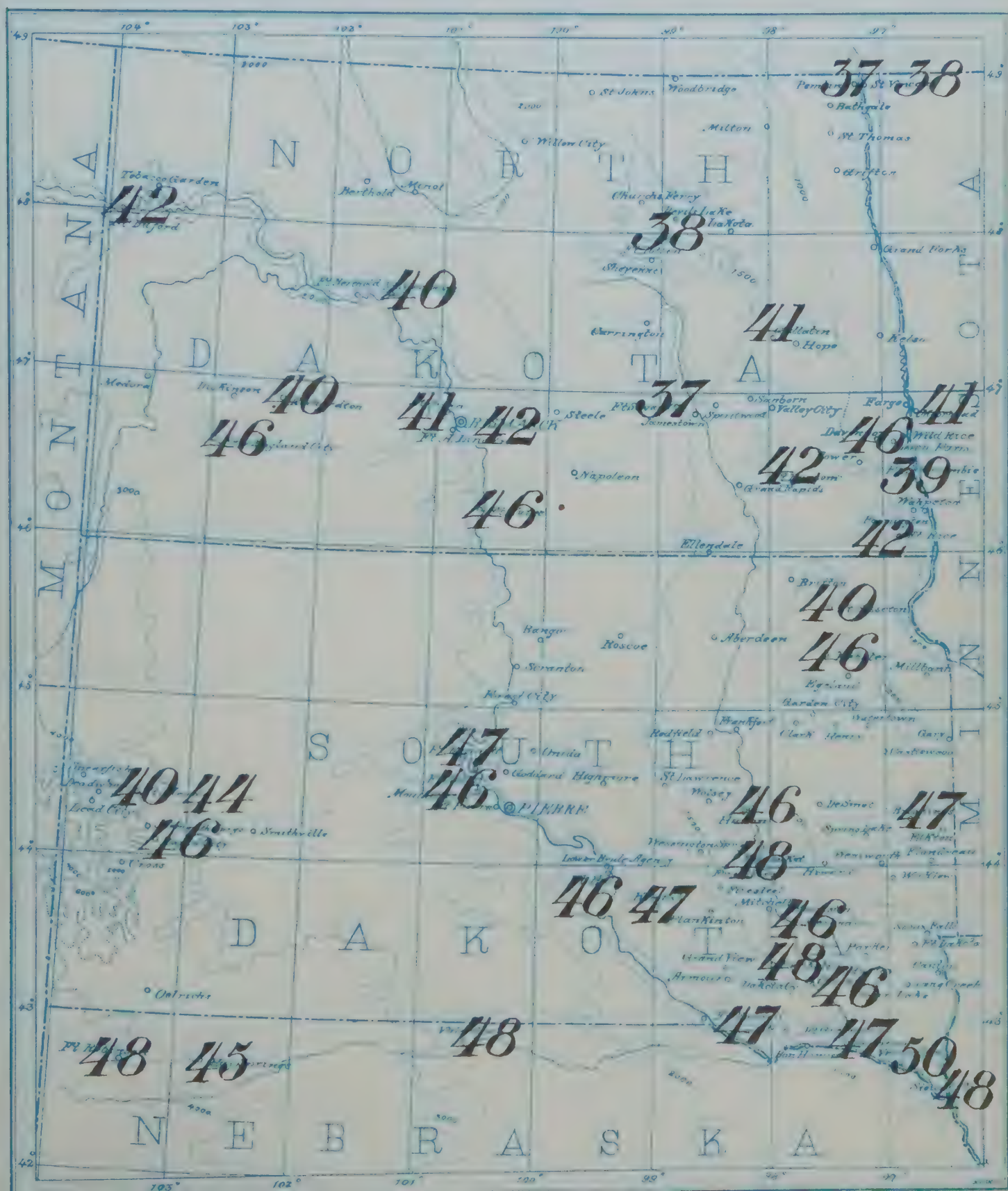
*Average Temperatures, in degrees Fahrenheit,
February.*



Appendix No. 69.
Average Temperatures, in degrees Fahrenheit,
March.

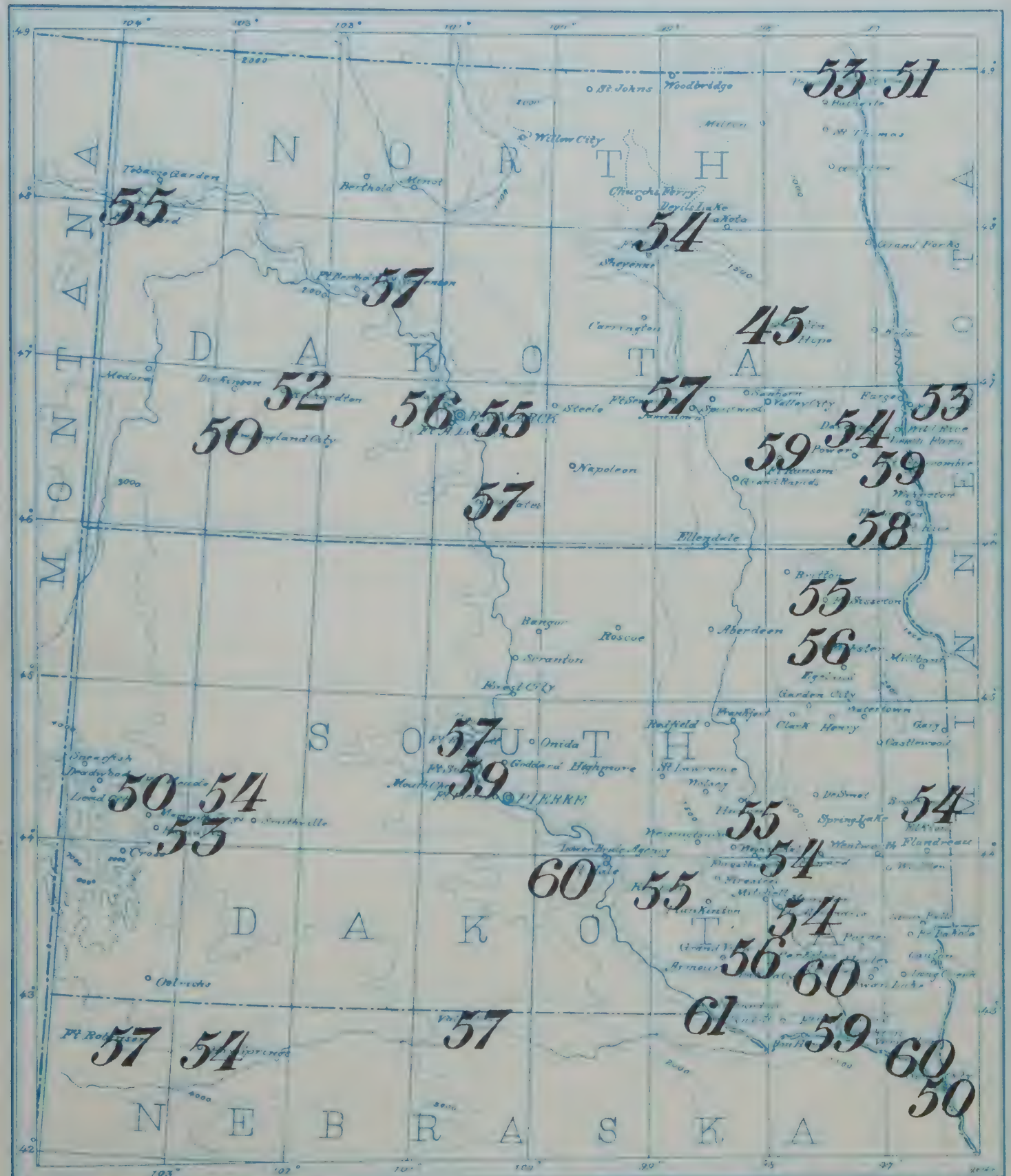


Appendix No. 70.
Average Temperatures, in degrees Fahrenheit,
April.



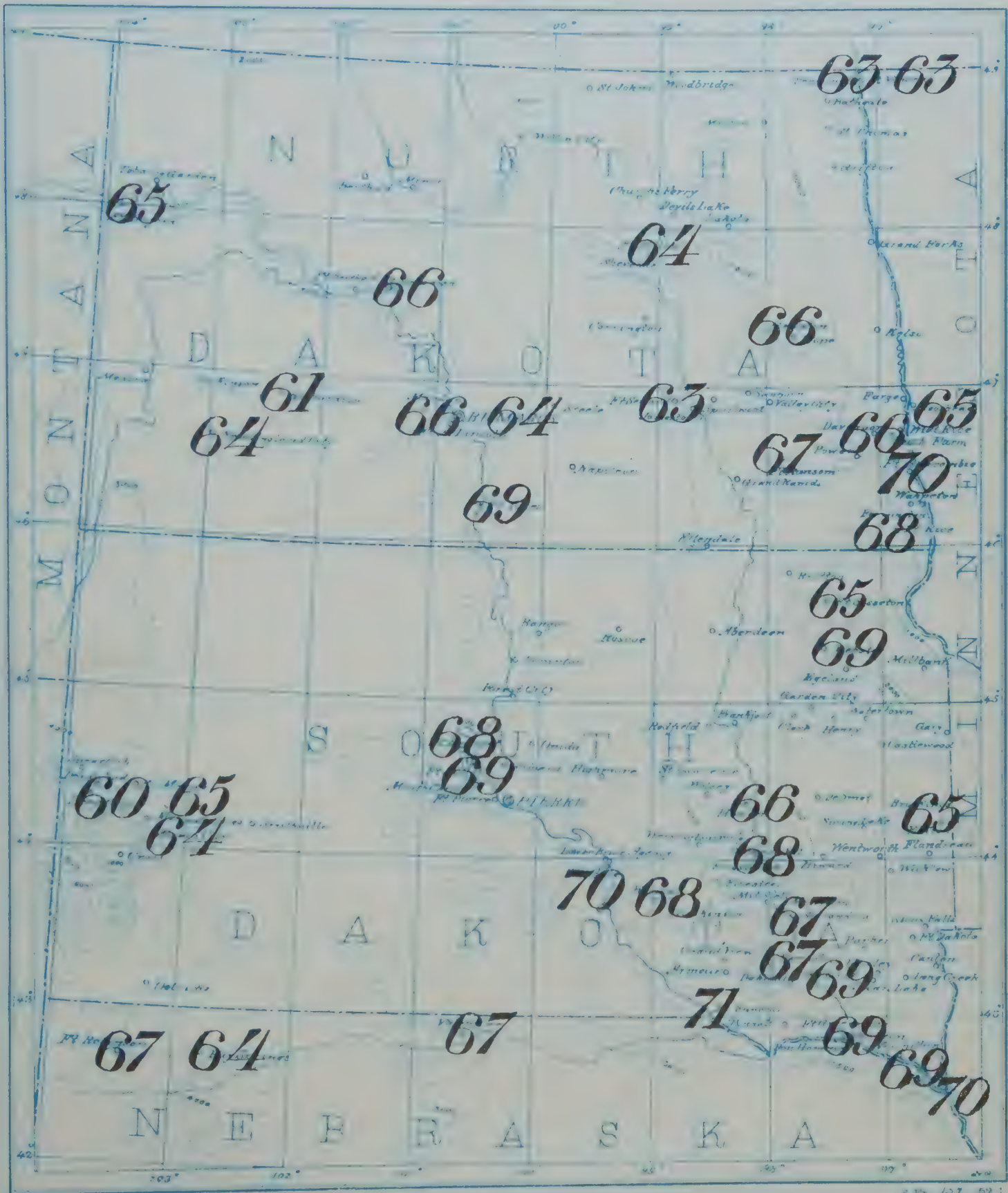
Appendix No. 71.

Average Temperatures, in degrees Fahrenheit,
May.

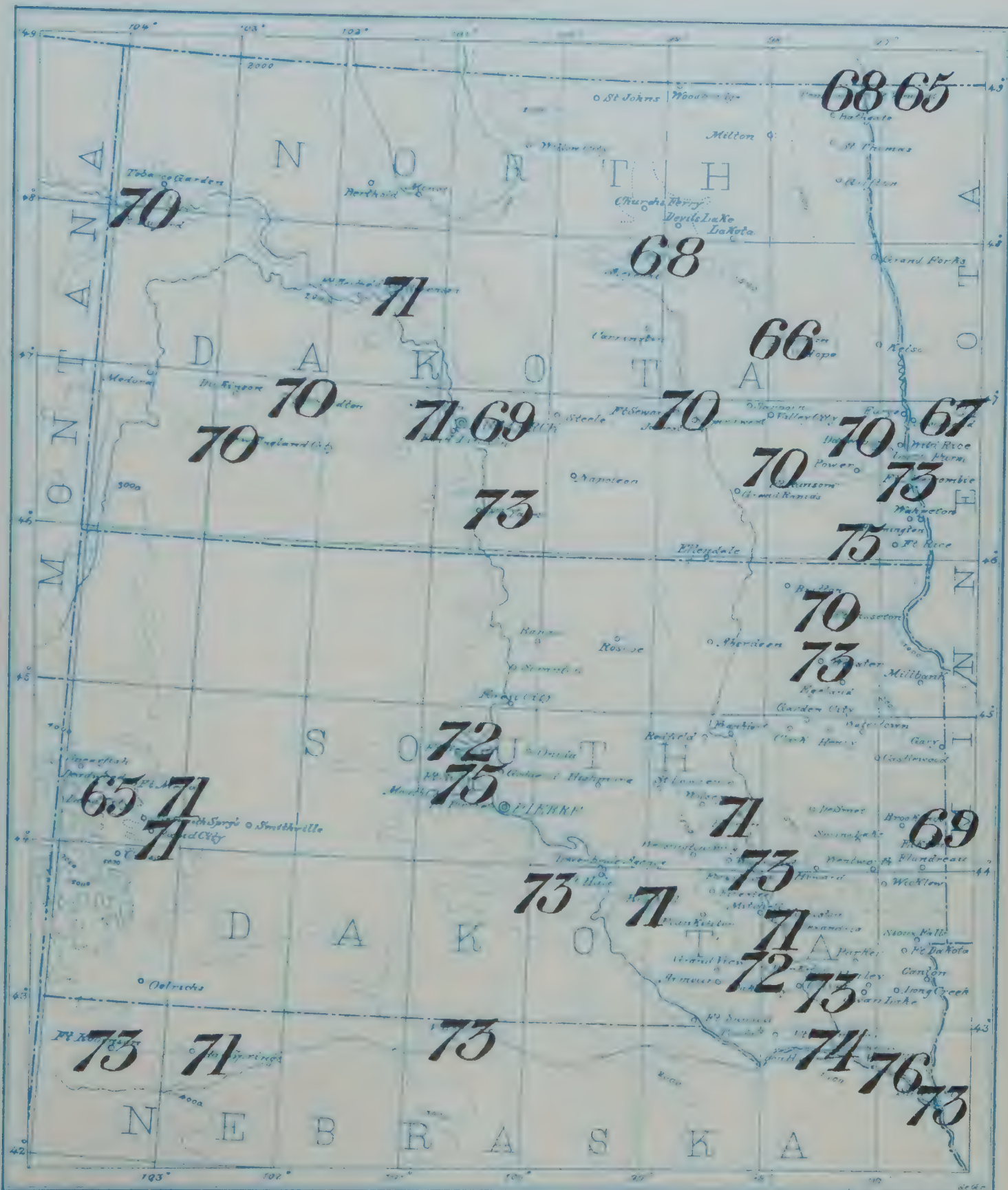


Appendix No.72.

*Average Temperatures, in degrees Fahrenheit,
June.*

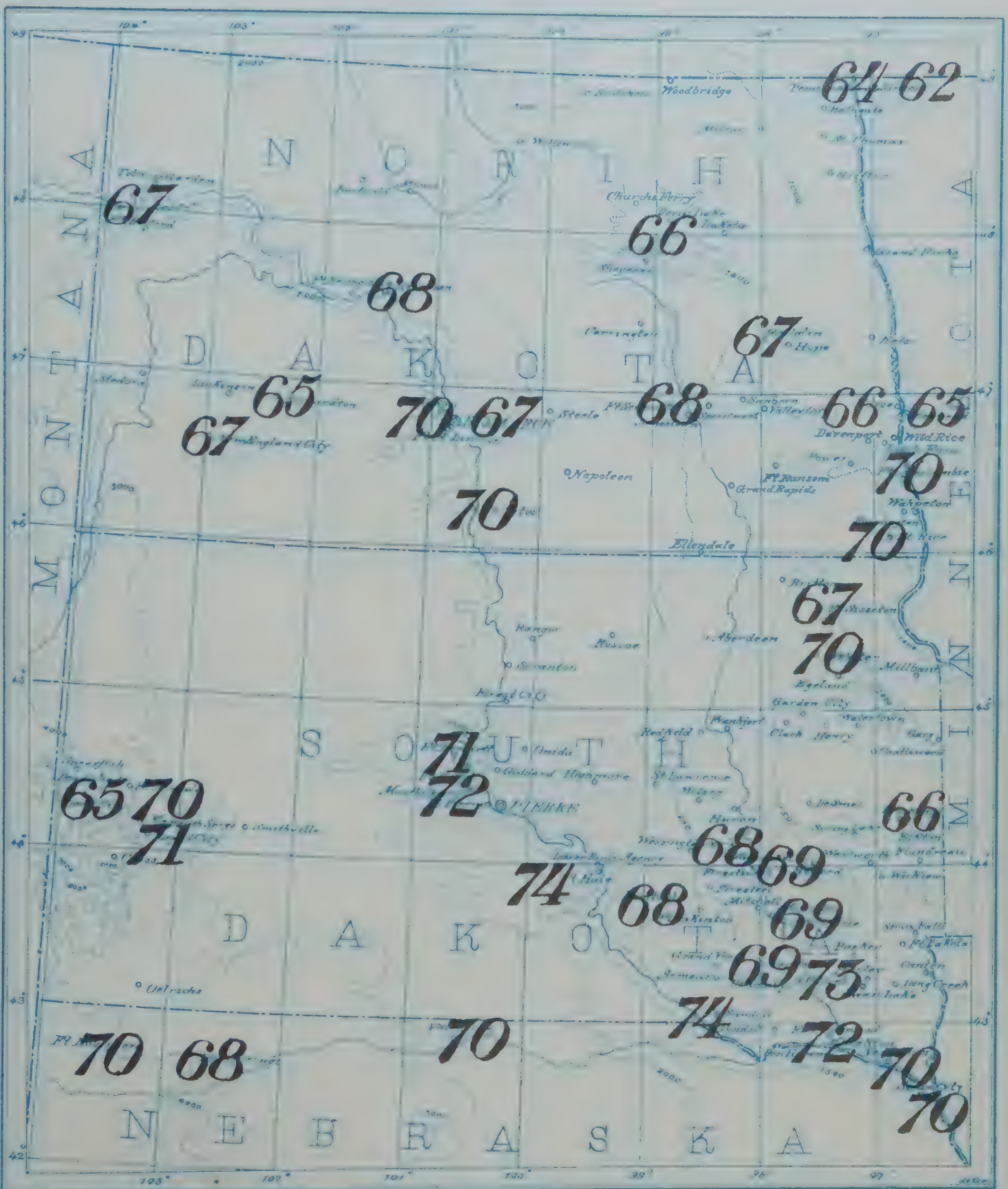


Appendix No. 73.
Average Temperatures, in degrees Fahrenheit,
July.



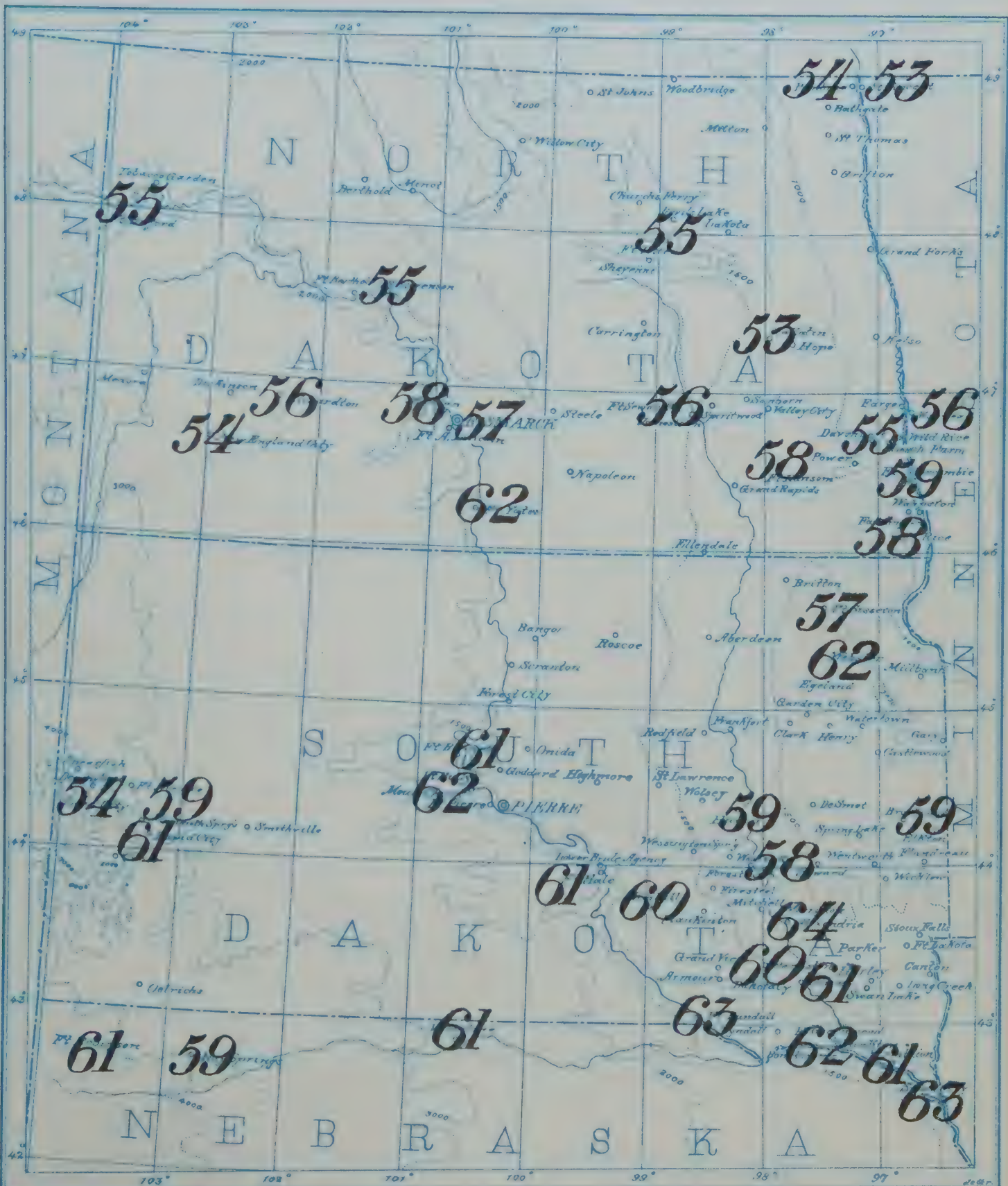
Appendix No. 74.

*Average Temperatures, in degrees Fahrenheit,
August.*



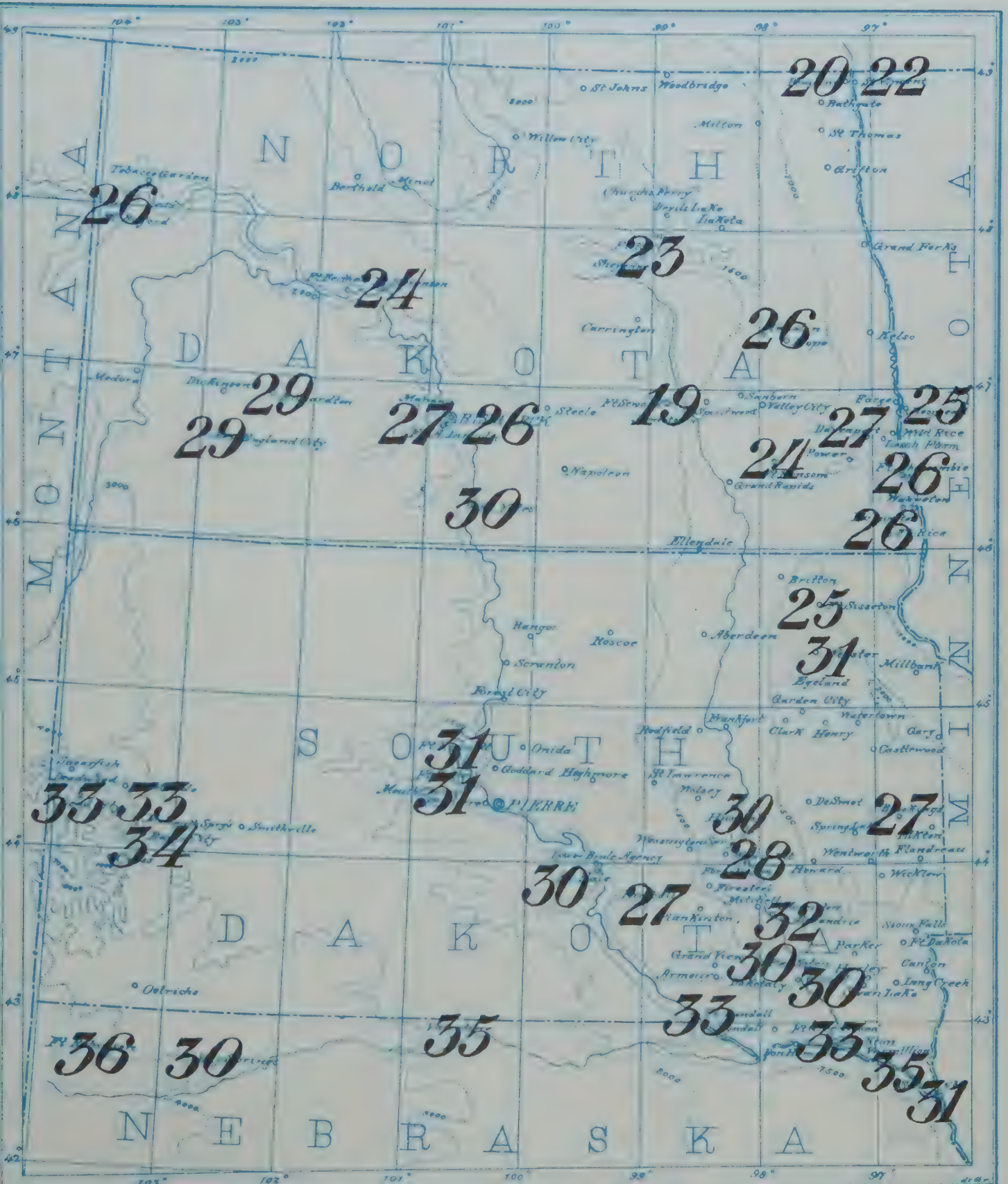
Appendix No. 75.

Average Temperatures, in degrees Fahrenheit,
September.



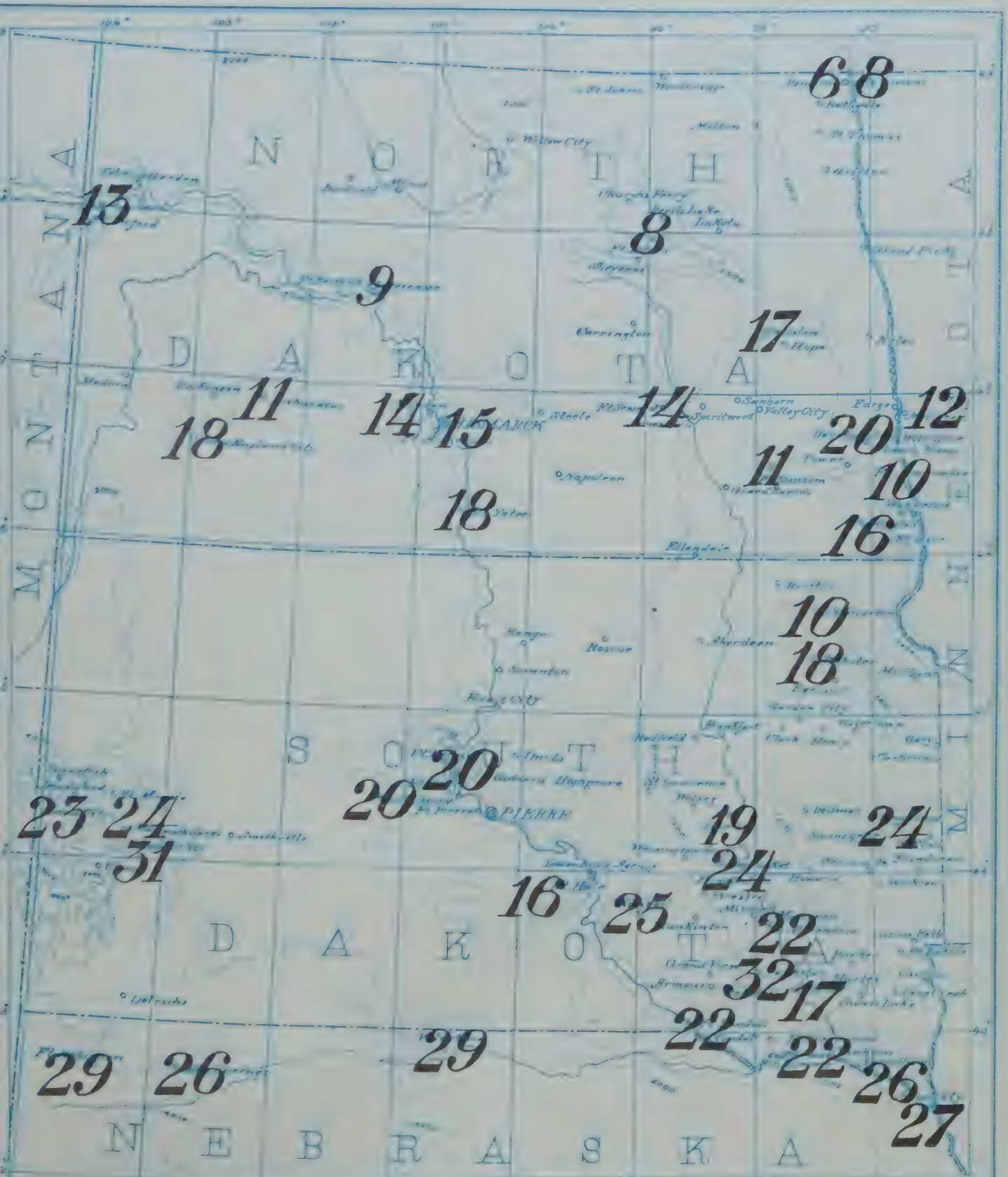
Appendix No. 77.

Average Temperatures, in degrees Fahrenheit,
November.



Appendix No. 78.

*Average Temperatures, in degrees Fahrenheit,
December.*



Monthly absolute minimum temperatures, with monthly and annual averages, at stations in Minnesota—Continued.

ST. VINCENT, MINN.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1880.....									27	15	-22	-42	
1881.....	-44	-31	-12	-14	28	37	40	36	23	18	-18	-20	3
1882.....	-42	-35	-25	-8	21	36	42	41	25	23	-5	-30	4
1883.....	-44	-38	-31	-4	26	29	40	39	17	11	-22	-40	-1
1884.....	-41	-37	-27	18	29	39	41	38	32	10	-19	-49	3
1885.....	-46	-39	-25	-14	22	32	39	27	24	17	-1	-21	1
1886.....	-41	-36	-13	-1	22	30	44	33	24	15	-18	-38	2
1887.....	-42	-38	-27	-4	25	34	38	29	18	-10	-30	-44	-4
1888.....	-53	-50	-29	6	14	25	46	30	24	19	-7	-16	0.7
1889.....	-36	-43	-9	9	22	33	31	32	28	9	-5	-21	5
1890.....	-38	-36	-30	13	15	40	43	30	29	23	-2	-27	5
1891.....	-27	-34	-29	6	16	32	37	32	29	20	-24	-27	3
Means	-41	-38	-23	0.6	22	33	41	33	25	14	-14	-31	2

Monthly absolute minimum temperatures, with monthly and annual averages, at stations in Nebraska.

HAY SPRINGS, NEBR.

1886.....	-31	-5	-15	5	25	33	55	40	30	23	-5	-13	12
1887.....	-23	-24	6	15	27	39	47	44	31	2	-26	-28	9
1888.....	-30	-2	-14	23	29	37	52	34	30	17	3	-6	14
1889.....	-5	-20	4	19	26	39	43	43	24	22	-6	-3	16
1890.....	-19	-21	-1	16	28	36	52	43	23	17	12	7	16
1891.....	-3	-20	-21	13	24	43	42	37	33	20	-9	-8	13
Means	-18	-15	-7	15	26	38	48	40	28	20	-5	-8	14

ROBINSON, FORT, NEBR.

1883.....							40	37	28	14	-5	-4	
1884.....	-22	-39		10	26	46	40	42	32	14	-8		
1885.....	-25	-24	0	22	18	35	50	38	35	9	11	-13	13
1886.....	-33	-5	-8	12	24	41	50	38	26	12	-16	-13	11
1887.....	-25	-27	2	18	30	39	49	45	31	1	-19	-26	10
1888.....				20									
1889.....	1	-17	8	20	22	38	40	40	24	24	0	-1	17
1890.....	-20	-23	4	18	27	36	51	36	27	19	10	-5	15
1891.....	3	-15	-19	15	25	41	42	40	35	15	-10	-3	14
Means	-17	-21	-2	17	24	39	45	39	30	14	-5	-9	13

VALENTINE, NEBR.

1885.....									35	22	16	-9	
1886.....	-30	-19	-8	13	25	43	44	37	35	23	-3	-16	12
1887.....	-30	-22	-5	14	21	39	38	38	32	27	-31	-29	8
1888.....	-35	-8	-15	24	32	41	49	41	29		9	-18	
1889.....	-10	-15	10	23	23	43	44	46	33	22	-2	-5	18
1890.....	-24	-22	-3	17	26	44	54	44	27	19	1	1	15
1891.....	0	-18	-26	13	26	45	44	39	37	24	-18	-8	13
Means	-22	-17	-8	17	26	42	46	41	32	23	-4	-12	14

APPENDIX No. 80.

Average consecutive number of days without rain, including traces.

[A "trace" of rainfall means an amount too small to measure.]

Station.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Length of record.
NORTH DAKOTA.													
Fort Abercrombie	16	14	13	12	11	10	10	12	12	19	15	16	Aug., 1860-Oct., 1877. July, 1873-July, 1891. Sept., 1874-Dec., 1891. Sept., 1866-Dec., 1891. Aug., 1871-Dec., 1891. Aug., 1869-Nov., 1890. Jan., 1882-Dec., 1891.
Fort Abraham Lincoln...	18	14	16	13	10	8	9	13	17	18	19	17	
Bismarck	11	9	10	9	8	6	7	11	13	12	12	11	
Fort Buford	13	11	13	13	11	8	12	14	16	16	15	16	
Fort Pembina	14	14	13	13	10	8	9	10	10	13	13	13	
Fort Totten	15	16	15	13	10	9	12	11	14	16	15	16	
Fort Yates	12	11	12	9	11	8	8	13	14	16	17	15	
Means	14	13	13	12	10	8	10	12	14	16	15	15	
SOUTH DAKOTA.													
Fort Bennett	13	10	16	10	7	7	8	13	12	15	16	16	{Oct., 1880-Nov., 1885. Feb., 1889-Oct., 1891. Jan., 1878-Dec., 1887. Jan., 1879-May, 1884. July, 1881-Dec., 1891. July, 1879-Dec., 1891. Feb., 1860-Dec., 1891. Jan., 1888-Dec., 1891. Sept., 1876-Apr., 1889. Jan., 1866-Dec., 1891. July, 1877-July, 1884. Dec., 1882-Dec., 1891. Apr., 1873-Dec., 1891.
Deadwood	9	8	7	6	5	6	8	11	12	10	10	8	
Fort Hale	15	15	14	12	10	8	11	13	22	14	22	16	
Huron	11	9	12	9	7	7	7	8	11	12	14	15	
Fort Meade	14	13	12	10	9	9	11	15	20	18	16	18	
Fort Randall	18	15	14	11	10	9	12	13	14	17	19	16	
Rapid City	13	8	7	7	5	6	9	9	15	13	11	16	
Fort Sisseton	14	13	14	10	9	8	7	12	14	13	17	13	
Fort Sully	14	13	14	11	9	10	10	13	15	16	14	16	
Morrison	16	14	14	12	8	5	10	13	11	14	17	12	
Webster	8	9	9	8	7	5	6	10	10	10	13	11	
Yankton	12	12	11	9	7	6	8	9	11	12	13	12	
Means	13	12	12	10	8	7	9	12	14	14	15	14	
MINNESOTA.													
Moorhead	10	8	10	8	8	8	9	9	10	11	10	9	Jan., 1881-Dec., 1891. Jan., 1881-Dec., 1891.
St. Vincent	9	8	11	12	11	8	6	8	10	11	14	11	
Means	9	8	10	10	9	8	7	8	10	11	12	10	
NEBRASKA.													
Hay Springs	12	10	9	9	9	10	8	10	18	15	14	16	Jan., 1886-Dec., 1891. July, 1883-Dec., 1891. Sept., 1885-Dec., 1891.
Fort Robinson	12	11	15	12	9	11	11	12	20	14	14	17	
Valentine	12	12	13	9	7	9	10	13	14	12	15	17	
Means	12	11	12	10	8	10	10	12	17	14	14	17	
IOWA.													
Sioux City	14	16	11	9	9	7	10	10	10	14	15	15	Aug., 1857-Dec., 1891.

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APPENDIX No. 81.

Average consecutive number of days without rain, excluding traces.

[A "trace" of rainfall means an amount too small to measure.]

Station.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Length of record.
NORTH DAKOTA.													
Fort Abercrombie	9	9	8	8	9	7	8	9	11	13	9	9	Aug., 1860-Oct., 1877.
Fort Abraham Lincoln...	13	12	11	10	9	7	8	11	15	14	12	14	July, 1873-July, 1891.
Bismarck	7	7	7	7	6	5	7	9	9	10	10	10	Sept., 1874-Dec., 1891.
Fort Buford	10	10	11	9	9	6	9	11	14	12	10	12	Sept., 1866-Dec., 1891.
Fort Pembina	12	13	12	11	10	7	8	10	10	12	13	11	Aug., 1871-Dec., 1891.
Fort Totten	11	12	12	11	9	8	9	9	12	13	11	12	Aug., 1869-Nov., 1890.
Fort Yates	11	10	10	9	9	6	7	12	14	14	11	11	Jan., 1882-Dec., 1891.
Means	10	10	10	9	9	7	8	10	12	13	11	11	
SOUTH DAKOTA.													
Fort Bennett	9	7	9	9	5	7	7	9	10	10	10	14	{Oct., 1880-Nov., 1885. Feb., 1889-Oct., 1891.
Deadwood	6	6	6	6	5	5	7	10	11	8	8	7	Jan., 1878-Dec., 1887.
Fort Hale	10	12	13	11	7	6	11	12	18	13	13	13	Jan., 1879-May, 1884.
Huron	7	7	8	8	5	6	5	7	8	10	10	9	July, 1881-Dec., 1891.
Fort Meade	10	9	8	7	7	7	9	13	16	13	12	13	July, 1879-Dec., 1891.
Fort Randall	12	11	12	9	8	7	9	10	12	14	12	13	Feb., 1860-Dec., 1891.
Rapid City	10	6	6	6	5	4	6	6	10	11	10	10	Jan., 1888-Dec., 1891.
Fort Sisseton	8	8	7	7	5	6	5	8	10	10	10	9	Sept., 1876-Apr., 1889.
Fort Sully	10	11	11	9	7	8	8	12	13	13	12	13	Jan., 1866-Dec., 1891.
Morrison	10	11	8	10	5	5	8	10	8	11	8	11	July, 1877-July, 1884.
Webster	8	7	7	8	6	5	5	9	9	11	12	10	Dec., 1882-Dec., 1891.
Yankton	8	9	8	7	6	6	7	7	9	10	11	10	Apr., 1873-Dec., 1891.
Means	9	9	9	8	6	6	7	9	11	11	11	11	
MINNESOTA.													
Moorhead	7	6	5	7	7	6	6	7	8	9	8	8	Jan., 1881-Dec., 1891.
St. Vincent	7	7	8	9	8	6	5	8	8	8	9	9	Jan., 1881-Dec., 1891.
Means	7	6	6	8	7	6	5	7	8	8	8	8	
NEBRASKA.													
Hay Springs	10	7	7	7	6	6	7	7	12	11	10	14	Jan., 1886-Dec., 1891.
Fort Robinson	12	11	12	10	9	9	8	12	18	12	12	17	July, 1883-Dec., 1891.
Valentine	10	8	10	8	6	8	9	7	13	11	12	13	Sept., 1885-Dec., 1891.
Means	11	9	10	8	7	8	8	9	14	11	11	15	
IOWA.													
Sionx City	13	13	11	9	8	6	9	10	9	12	14	15	Aug., 1857-Dec., 1891.

APPENDIX No. 82.

Maximum period of drought expressed by the greatest consecutive number of days without traces and with them.

[A "trace" of rainfall means an amount too small to measure, 0.01 inch being the smallest quantity measured by the Weather Bureau in recording precipitation.]

BISMARCK, N. DAK.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1874	23	Sept. 20-Oct. 12	23	Sept. 20-Oct. 12.
1875	14	Apr. 11-Apr. 24	14	Apr. 11-Apr. 24.
1876	12	May 1-May 12	12	May 1-May 12.
1877	20	Jan. 21-Feb. 9	31	Jan. 21-Feb. 20.
1878	14	Jan. 10-Jan. 23	43	Jan. 1-Feb. 12.
1879	14	Aug. 6-Aug. 19	25	Sept. 6-Sept. 30.
1880	19	Oct. 1-Oct. 14	36	Sept. 20-Oct. 25.
1881	27	Dec. 2-Dec. 28	27	Dec. 2-Dec. 28.
1882	15	Feb. 1-Feb. 15	17	Sept. 1-Sept. 17.
1883	18	Nov. 1-Nov. 18	24	Sept. 7-Sept. 30.
1884	18	Nov. 2-Nov. 19	18	Nov. 2-Nov. 19.
1885	17	Oct. 12-Oct. 28	19	Sept. 12-Sept. 30.
1886	16	Nov. 6-Nov. 21	21	Nov. 1-Nov. 21.
1887	22	Oct. 24-Nov. 14	22	Oct. 24-Nov. 14.
1888	24	Sept. 20-Oct. 13	29	Sept. 15-Oct. 13.
1889	19	July 26-Aug. 13	53	Oct. 1-Nov. 22.
1890	17	Oct. 1-Oct. 19	19	Dec. 5-Dec. 23.
1891	14	Dec. 7-Dec. 23	21	Jan. 2-Jan. 22.
Means	18		25	

FORT ABERCROMBIE, N. DAK.

1861	17	Dec. 6-Dec. 22	24	Dec. 1-Dec. 24.
1862	19	Oct. 13-Oct. 31	57	Oct. 4-Nov. 29.
1865	10	Feb. 3-Feb. 12	18	Nov. 1-Nov. 18.
1867	21	Nov. 3-Nov. 12	46	Sept. 16-Oct. 31.
1868	18	Nov. 9-Nov. 29	36	Sept. 26-Oct. 31.
1869	13	Oct. 9-Oct. 26	40	Jan. 4-Feb. 12.
1870	22	Jan. 18-Jan. 30	34	Nov. 19-Dec. 22.
1871	22	Sept. 22-Oct. 13	25	Aug. 2-Aug. 26.
1872	23	Sept. 9-Sept. 30	27	Oct. 1-Oct. 27.
1873	11	Oct. 5-Oct. 27	45	Nov. 17-Dec. 31.
1874	25	June 9-June 19	61	Nov. 1-Dec. 31.
1875	14	Sept. 17-Oct. 11	90	Jan. 1-Mar. 31.
1876	19	July 15-July 28	19	Oct. 1-Oct. 19.
Means	18	Oct. 1-Oct. 19	40	

FORT ABRAHAM LINCOLN, N. DAK.

1874	28	Feb. 1-Feb. 28	28	Feb. 1-Feb. 28.
1875	17	Mar. 15-Mar. 31	31	Dec. 1-Dec. 28.
1876	35	Sept. 14-Oct. 18	35	Dec. 1-Dec. 31.
Means				Sept. 14-Oct. 18.

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Maximum period of drought expressed by the greatest consecutive number of days, etc.—Continued.

FORT ABRAHAM LINCOLN, N. DAK.—Continued.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1877	38	Jan. 14-Feb. 20	39	Jan. 13-Feb. 20.
1878	22	Sept. 9-Sept. 30	40	Nov. 1-Dec. 10.
1879	23	Sept. 1-Sept. 23	44	Sept. 1-Oct. 14.
1880	26	Sept. 19-Oct. 14	113	Jan. 1-Apr. 22.
1881	41	Nov. 18-Dec. 28	49	² Nov. 13-Dec. 31.
1882	22	Jan. 25-Feb. 15	48	Jan. 1-Feb. 17.
1883	29	Oct. 21-Nov. 18	29	Oct. 21-Nov. 18.
1884	26	Oct. 5-Oct. 30	26	Oct. 5-Oct. 30.
1885	19	Sept. 12-Sept. 30	19	{Sept. 12-Sept. 30. Nov. 12-Nov. 30.
1886	33	Oct. 20-Nov. 21	34	Oct. 20-Nov. 22.
1887	14	Nov. 1-Nov. 14	18	Sept. 13-Sept. 30.
1888	38	Nov. 15-Dec. 22	38	Nov. 15-Dec. 22.
1889	31	Oct. 1-Oct. 31	53	³ Oct. 1-Nov. 22.
1890	36	Jan. 12-Feb. 16	36	Jan. 12-Feb. 16.
Means	28	-----	40	-----

¹October 17-November 22 (37).

²January and October.

³April and 29 days December.

FORT BUFORD, N. DAK.

1867	19	Mar. 1-Mar. 19	25	Mar. 1-Mar. 25.
1868	26	Mar. 6-Mar. 31	26	Mar. 6-Mar. 31.
1869	27	Jan. 1-Jan. 27	47	Jan. 1-Feb. 16.
1870	30	Apr. 15-May 14	30	Apr. 15-May 14.
1871	29	Sept. 1-Sept. 29	43	Mar. 17-Apr. 28.
1872	37	Feb. 1-Mar. 8	37	Feb. 1-Mar. 8.
1873	27	Dec. 1-Dec. 27	36	July 1-Aug. 5.
1874	44	Sept. 10-Oct. 23	44	Sept. 10-Oct. 23.
1875	31	Dec. 1-Dec. 31	31	Dec. 1-Dec. 31.
1876	39	¹ July 1-Aug. 8	39	July 1-Aug. 8.
1877	59	² Jan. 15-Mar. 14	59	Jan. 15-Mar. 14.
1878	46	Jan. 1-Feb. 15	46	Jan. 1-Feb. 15.
1880	14	Mar. 18-Mar. 31	20	Mar. 12-Mar. 31.
1881	22	Aug. 5-Aug. 26	22	Aug. 5-Aug. 26.
1882	22	July 23-Aug. 13	22	July 23-Aug. 13.
1883	12	Apr. 9-Apr. 20	25	Oct. 24-Nov. 18.
1884	12	May 18-May 29	19	Nov. 1-Nov. 19.
1885	25	Sept. 15-Oct. 9	44	Sept. 15-Oct. 28.
1886	14	May 14-May 27	21	Aug. 5-Aug. 25.
1887	17	Sept. 14-Sept. 30	18	Sept. 13-Sept. 30.
1888	14	Aug. 17-Aug. 30	38	Nov. 15-Dec. 22.
1889	21	Oct. 1-Oct. 21	42	Oct. 1-Nov. 11.
1890	23	Nov. 2-Nov. 24	24	Nov. 1-Nov. 24.
1891	12	Dec. 4-Dec. 15	20	Sept. 2-Sept. 21.
Means	26	-----	32	-----

¹September 19-October 18 (37).

²August 1-September 12 (43).

FORT PEMBINA, N. DAK.

1872	13	Feb. 9-Feb. 21	23	Feb. 4-Feb. 26.
1873	21	Mar. 1-Mar. 21	21	Mar. 1-Mar. 21.
1874	27	Mar. 21-Apr. 16	27	Mar. 21-Apr. 16.
1875	13	Feb. 3-Feb. 15	18	Feb. 1-Feb. 18.
1876	17	Jan. 5-Jan. 21	17	Jan. 5-Jan. 21.
1877	34	Jan. 18-Feb. 20	34	Jan. 18-Feb. 20.
1878	25	Jan. 6-Jan. 31	25	Jan. 6-Jan. 31.
1879	17	Mar. 14-Mar. 30	18	Mar. 14-Mar. 31.
1880	30	Nov. 1-Nov. 30	30	Nov. 1-Nov. 30.
1881	23	Apr. 1-Apr. 23	23	Apr. 1-Apr. 23.
1883	20	Mar. 12-Mar. 31	25	Mar. 7-Mar. 31.

Maximum period of drought expressed by the greatest consecutive number of days, etc.—Continued.

FORT PEMBINA, N. DAK.—Continued.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1885	28	Sept. 13-Oct. 10	48	Nov. 13-Dec. 30.
1886	22	Nov. 1-Nov. 22	26	Mar. 20-Apr. 14.
1887	15	Nov. 1-Nov. 15	20	Apr. 11-Apr. 30.
1888	29	Nov. 2-Nov. 30	29	Nov. 2-Nov. 30.
1889	29	Sept. 25-Oct. 23	29	Sept. 25-Oct. 23.
1890	28	Nov. 2-Nov. 29	28	Nov. 2-Nov. 29.
1891	24	Aug. 21-Sept. 13	24	Aug. 21-Sept. 13.
Means	23	.....	26	.....

FORT TOTTEN, N. DAK.

1870	23	¹ Sept. 8-Sept. 30	31	Jan. 1-Jan. 31.
1871	21	Feb. 8-Feb. 28	27	July 1-July 27.
1872	27	Oct. 1-Oct. 27	29	Oct. 1-Oct. 29.
1873	25	Dec. 1-Dec. 25	30	Dec. 2-Dec. 30.
1874	19	Oct. 5-Oct. 23	36	Sept. 18-Oct. 23.
1875	20	Feb. 1-Feb. 20	20	Feb. 1-Feb. 20.
1876	34	Apr. 10-May 13	42	Oct. 1-Nov. 11.
1877	45	Jan. 15-Feb. 28	45	² Jan. 15-Feb. 28.
1878	31	³ Jan. 1-Jan. 31	31	⁴ Jan. 1-Jan. 31.
1879	21	⁵ Apr. 9-Apr. 29	25	Nov. 1-Nov. 25.
1880	21	Sept. 23-Oct. 13	54	Feb. 1-Mar. 25.
1881	15	Dec. 17-Dec. 31	31	⁶ Dec. 1-Dec. 31.
1882	15	{Sept. 12-Sept. 26} {Dec. 17-Dec. 31}	33	Jan. 18-Feb. 19.
1883	15	{Sept. 4-Sept. 18} {July 26-Aug. 9}	23	Mar. 6-Mar. 28.
1884	18	Mar. 13-Mar. 30	18	Mar. 13-Mar. 30.
1885	22	Feb. 7-Feb. 28	22	Feb. 7-Feb. 28.
1886	21	Mar. 20-Apr. 9	22	⁸ Mar. 20-Apr. 10.
1887	20	Oct. 24-Nov. 12	20	Oct. 24-Nov. 12.
1888	16	May 12-May 27	35	Nov. 7-Dec. 11.
1889	43	⁹ Oct. 1-Nov. 12	43	Oct. 1-Nov. 12.
1890	44	Oct. 18-Nov. 30	44	Oct. 18-Nov. 30.
Means	25	.....	31	.....

¹ August 2-August 22 (21).² August 1-September 14 (45); October 16-November 15 (31).³ March 12-April 7 (27).⁴ July 18-August 11 (25).⁵ October 10-October 28 (19); December 11-December 29 (19); November 2-November 20 (19).⁶ December 1-December 31 (31).⁶ March 18-April 13.⁷ November 12-November 28 (17).⁸ November 1-November 21 (21).

FORT YATES, N. DAK.

1882	18	Aug. 1-Aug. 18	35	Jan. 13-Feb. 17.
1883	54	Aug. 12-Oct. 4	64	¹ Aug. 12-Oct. 14.
1884	24	Oct. 5-Oct. 28	46	Oct. 5-Nov. 19.
1885	18	² Oct. 11-Oct. 28	19	Nov. 12-Nov. 30.
1886	15	Oct. 25-Nov. 8	34	Oct. 20-Nov. 22.
1887	16	Oct. 23-Nov. 7	31	Dec. 1-Dec. 31.
1888	29	Sept. 15-Oct. 13	38	Nov. 16-Dec. 23.
1889	26	Mar. 20-Apr. 14	26	³ Mar. 20-Apr. 14.
1890	30	Jan. 18-Feb. 16	30	Jan. 18-Feb. 16.
1891	19	Jan. 13-Jan. 31	19	Jan. 13-Jan. 31.
Means	25	.....	34	.....

¹ October 21-November 30 (41); April 23-May 19 (27).² September 14-September 30 (17).³ February 16-March 12 (25); July 25-August 17 (24).

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Maximum period of drought expressed by the greatest consecutive number of days, etc.—Continued.

DEADWOOD, S. DAK.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1879	13	Oct. 1-Oct. 13	24	Jan. 8-Jan. 31.
1880	11	Dec. 2-Dec. 12	11	Dec. 2-Dec. 12.
1881	16	{Aug. 3-Aug. 18} {Dec. 9-Dec. 24}	18	Dec. 9-Dec. 26.
1882	18	Aug. 1-Aug. 18	18	¹ Aug. 1-Aug. 18.
1883	17	Sept. 14-Sept. 30	17	Sept. 14-Sept. 30.
1884	15	Nov. 1-Nov. 15	16	Nov. 1-Nov. 16.
1885	19	Sept. 12-Sept. 30	19	Sept. 12-Sept. 30.
1886	15	July 1-July 15	15	July 1-July 15.
1887	12	June 13-June 24	16	June 13-June 28.
Means	15	.....	17	

¹ August 4-August 18 (15).

FORT BENNETT, S. DAK.

1882	15	{Sept. 3-Sept. 17} {Jan. 23-Feb. 11}	23	Jan. 24-Feb. 15.
1883	15	Oct. 25-Nov. 8	37	Oct. 25-Nov. 30.
1884	13	Nov. 3-Nov. 15	25	Nov. 1-Nov. 25.
1885	22	Sept. 13-Oct. 4	27	Sept. 13-Oct. 9.
1890	27	Dec. 5-Dec. 31	30	Jan. 19-Feb. 17.
Means	18	.....	28	

FORT HALE, S. DAK.

1879	26	Oct. 17-Nov. 11	45	Oct. 17-Nov. 30.
1880	30	Sept. 1-Sept. 30	36	¹ Mar. 13-Apr. 17.
1881	21	Dec. 11-Dec. 31	31	Dec. 1-Dec. 31.
1882	26	Sept. 1-Sept. 26	30	Sept. 1-Sept. 30.
1883	38	Oct. 24-Nov. 30	38	Oct. 24-Nov. 30.
Means	28	.....	36	

¹ October 16-November 18 (34).

FORT MEADE, S. DAK.

1880	25	Mar. 20-Apr. 13	45	Sept. 1-Oct. 15.
1881	19	Dec. 9-Dec. 27	45	Sept. 7-Oct. 21.
1882	20	Aug. 1-Aug. 20	22	Jan. 1-Jan. 22.
1883	15	July 7-July 21	43	Feb. 3-Mar. 17.
1884	16	Oct. 3-Oct. 18	45	Oct. 3-Nov. 16.
1885	26	Sept. 13-Oct. 8	29	Sept. 10-Oct. 8.
1886	15	{Aug. 4-Aug. 18} {Sept. 16-Sept. 30}	33	Oct. 12-Nov. 13.
1887	15	June 13-June 27	23	Jan. 8-Jan. 30.
1888	29	Sept. 2-Sept. 30	45	Aug. 17-Sept. 30.
1889	34	July 29-Aug. 31	34	July 29-Aug. 31.
1890	50	¹ Sept. 4-Oct. 23	50	² Sept. 4-Oct. 23.
1891	36	³ Oct. 5-Nov. 9	36	Oct. 5-Nov. 9.
Means	25	.....	38	

¹ Also 22 days November.² Also 29 days December.³ Also 27 days December.

Maximum period of drought expressed by the greatest consecutive number of days, etc.—Continued.

FORT RANDALL, S. DAK.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1860	25	Oct. 1-Oct. 25	28	Nov. 3-Nov. 30.
1861	23	Mar. 3-Mar. 25	26	Mar. 3-Mar. 28.
1862	17	Dec. 15-Dec. 31	25	Apr. 17-May 11.
1863	21	Mar. 20-Apr. 9	31	Feb. 16-Mar. 18.
1864	45	Nov. 17-Dec. 31	61	Nov. 1-Dec. 31.
1868	24	Dec. 7-Dec. 30	25	Dec. 7-Dec. 31.
1869	27	Jan. 1-Jan. 27	31	Jan. 1-Jan. 31.
1870	18	Oct. 8-Oct. 25	43	Jan. 17-Feb. 28.
1871	16	Sept. 14-Sept. 29	28	Jan. 1-Jan. 28.
1872	22	Oct. 5-Oct. 26	49	Jan. 1-Feb. 18.
1873	26	Sept. 1-Sept. 26	28	Aug. 2-Aug. 29.
1874	15	Oct. 5-Oct. 19 Dec. 17-Dec. 31	17	Feb. 6-Feb. 22.
1875	29	Oct. 9-Nov. 6	61	Oct. 1-Nov. 30.
1876	29	Sept. 21-Oct. 19	29	Sept. 21-Oct. 19.
1877	30	Jan. 20-Feb. 18	49	Jan. 1-Feb. 18.
1878	14	Jan. 10-Jan. 23	34	Nov. 11-Dec. 14.
1879	40	Oct. 16-Nov. 24	46	Oct. 16-Nov. 30.
1880	31	Mar. 18-Apr. 17	61	Oct. 16-Dec. 15.
1881	21	Dec. 11-Dec. 31	27	Aug. 3-Aug. 29.
1882	24	Sept. 1-Sept. 24	50	Oct. 12-Nov. 30.
1883	31	Aug. 15-Aug. 14 Nov. 3-Nov. 20 Feb. 8-Feb. 25	37	Oct. 25-Nov. 30.
1884	18	Nov. 7-Nov. 30	27	Nov. 1-Nov. 27.
1885	24	July 1-July 17	24	Nov. 7-Nov. 30.
1886	17	Nov. 1-Nov. 22	28	July 1-July 28.
1887	22	Mar. 5-Mar. 23	22	Nov. 1-Nov. 22.
1888	19	Feb. 16-Mar. 19	30	Nov. 1-Nov. 30.
1889	32	Jan. 15-Feb. 21	32	Feb. 16-Mar. 19.
1890	38	Mar. 4-Mar. 27	38	Jan. 15-Feb. 21.
1891	24		24	Mar. 4-Mar. 27.
Means	25		35	

¹ January 13-January 28 (16), and December 1-December 16 (16).
² September 12-October 26 (45).

³ January 1-February 11 (42).
⁴ February 14-March 18 (33); August 15-September 18 (38).

FORT SISSETON, S. DAK.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1878	10	Apr. 11-Apr. 20 Sept. 18-Sept. 27	50	Oct. 12-Nov. 30.
1880	11	Jan. 1-Jan. 11	25	Oct. 18-Nov. 11.
1881	13	Oct. 26-Nov. 5 Mar. 17-Mar. 29	35	Nov. 14-Dec. 18.
1882	18	Dec. 14-Dec. 31	19	Aug. 1-Aug. 19.
1883	22	Nov. 1-Nov. 22	30	Sept. 10-Sept. 28.
1884	14	Oct. 6-Oct. 19 Nov. 2-Nov. 15	18	Nov. 1-Nov. 30.
1885	17	Sept. 14-Sept. 30	17	Nov. 2-Nov. 19.
1886	16	Sept. 25-Oct. 10 Nov. 6-Nov. 21	19	Sept. 14-Sept. 30.
1887	13	Dec. 5-Dec. 17	36	Nov. 3-Nov. 21.
Means	15		28	Feb. 11-Mar. 18.

¹ December 3-December 25 (23).

FORT SULLY, S. DAK.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1869	28	Dec. 2-Dec. 29	31	Oct. 1-Oct. 31.
1870	27	Nov. 14-Dec. 10	48	Nov. 14-Dec. 31.
1871	29	Sept. 1-Sept. 29	34	Feb. 8-Mar. 13.
1872	27	Oct. 1-Oct. 27	31	Jan. 1-Jan. 31.
1873	23	Dec. 9-Dec. 31	23	Dec. 9-Dec. 31.
1874	31	Apr. 5-Apr. 25	21	Apr. 5-Apr. 25.

¹ 28 in January, 30 in March, 27 in June; July 15-August 12 (29).

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Maximum period of drought expressed by the greatest consecutive number of days, etc.—Continued.

FORT SULLY, S. DAK.—Continued.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1875	20	Oct. 26–Nov. 14	37	Oct. 9–Nov. 14.
1876	22	Sept. 13–Oct. 4	37	Sept. 13–Oct. 19.
1877	39	Jan. 19–Feb. 26	39	Jan. 19–Feb. 26.
1878	23	Mar. 9–Mar. 31	28	Jan. 1–Jan. 28.
1879	25	Nov. 1–Nov. 25	25	Nov. 1–Nov. 25.
1880	17	Sept. 1–Sept. 17	27	Nov. 20–Dec. 16.
1881	43	Nov. 19–Dec. 31	50	Nov. 12–Dec. 31.
1882	24	Jan. 23–Feb. 15	48	Aug. 9–Sept. 25.
1883	41	Oct. 21–Nov. 30	41	Oct. 21–Nov. 30.
1884	47	Oct. 5–Nov. 20	48	Oct. 5–Nov. 21.
1885	23	{Sept. 12–Oct. 4} {Nov. 7–Nov. 29}	37	Sept. 12–Oct. 18.
1886	9	{Feb. 15–Feb. 23} {Oct. 23–Oct. 31}	19	Oct. 13–Oct. 31.
1887	45	Feb. 2–Mar. 18	67	¹ Feb. 2–Apr. 9.
1888	16	Sept. 15–Sept. 30	25	Nov. 16–Dec. 10.
1889	23	Feb. 25–Mar. 19	25	Feb. 23–Mar. 19.
1890	15	Dec. 16–Dec. 30	25	Dec. 6–Dec. 30.
1891	16	July 1–July 16	22	² Dec. 2–Dec. 23.
Means	26	.....	34	

¹ October 24–November 24 (32).² October 23–November 13 (22).

HURON, S. DAK.

1882	18	Oct. 12–Oct. 29	20	Oct. 12–Oct. 31.
1883	10	Sept. 24–Oct. 3	25	Nov. 6–Nov. 30.
1884	14	Oct. 6–Oct. 19	21	Nov. 1–Nov. 21.
1885	19	Nov. 12–Nov. 30	23	Dec. 9–Dec. 31.
1886	16	June 21–July 6	16	¹ June 21–July 6.
1887	20	Oct. 24–Nov. 12	20	² Oct. 24–Nov. 12.
1888	18	Sept. 22–Oct. 9	38	Nov. 16–Dec. 23.
1889	10	{Mar. 2–Mar. 11} {Oct. 1–Oct. 10}	16	Nov. 15–Nov. 30.
1890	16	Dec. 16–Dec. 31	26	Dec. 6–Dec. 31.
1891	11	Oct. 22–Nov. 1	25	Oct. 14–Nov. 7.
Means	15	.....	23	

¹ February 11–February 26 (16).² September 11–September 30 (20).

RAPID CITY, S. DAK.

1888	16	{Sept. 15–Sept. 30} {Aug. 21–Sept. 5}	24	Aug. 21–Sept. 13.
1889	12	Feb. 24–Mar. 7	18	Feb. 24–Mar. 13.
1890	12	{Jan. 20–Jan. 31} {Sept. 19–Sept. 30}	27	Sept. 4–Sept. 30.
1891	19	Oct. 21–Nov. 8	28	Oct. 13–Nov. 9.
Means	17	.....	22	

MORRISTON, S. DAK.

1878	22	Aug. 10–Aug. 31	24	Jan. 4–Jan. 27.
1879	14	Jan. 1–Jan. 14	29	July 20–Aug. 17.
1880	18	Feb. 6–Feb. 23	31	Mar. 18–Apr. 17.
1881	18	Dec. 11–Dec. 28	28	Apr. 12–May 9.
1882	20	Oct. 12–Oct. 31	20	Oct. 12–Oct. 31.
Means	18	.....	26	

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Maximum period of drought expressed by the greatest consecutive number of days, etc.—Continued.

WEBSTER, S. DAK.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1884	17	Nov. 3-Nov. 19	17	Nov. 3-Nov. 19.
1885	18	¹ Sept. 13-Sept. 30.	28	Feb. 1-Feb. 28.
1886	11	Nov. 10-Nov. 20.	14	Mar. 14-Mar. 27.
1887	8	May 3-May 10.	12	Nov. 1-Nov. 12.
1888	31	Nov. 15-Dec. 15.	31	Nov. 15-Dec. 15.
1889	21	July 29-Aug. 18.	21	July 29-Aug. 18.
1890	16	Nov. 15-Nov. 30.	19	Dec. 5-Dec. 23.
1891	12	Oct. 18-Oct. 29.	13	Oct. 18-Oct. 30.
Means	17		19	

¹ February 6-February 22 (17); January 12-January 27 (16).

YANKTON, S. DAK.

1874	16	Feb. 6-Feb. 21	16	Feb. 6-Feb. 21.
1875	14	Nov. 1-Nov. 14	14	Nov. 1-Nov. 14.
1876	13	Feb. 1-Feb. 13	25	Feb. 1-Feb. 25.
1877	30	Jan. 22-Feb. 20	32	Jan. 20-Feb. 20.
1878	20	Oct. 2-Oct. 21	27	Nov. 11-Dec. 7.
1879	16	¹ Sept. 7-Sept. 22	21	Jan. 11-Jan. 31.
1880	15	Apr. 3-Apr. 17	21	Nov. 24-Dec. 14.
1881	11	{Nov. 19-Nov. 29}	11	{Mar. 17-Mar. 27.
1882		{Mar. 17-Mar. 27}		{Nov. 19-Nov. 29.
1883	18	Oct. 13-Oct. 30	26	² Sept. 1-Sept. 26.
1884	16	Aug. 16-Aug. 31	28	³ Aug. 16-Sept. 12.
1885	13	Nov. 3-Nov. 15	20	Nov. 1-Nov. 20.
1886	14	Dec. 14-Dec. 27	24	⁴ Mar. 8-Mar. 31.
1887	16	Sept. 26-Oct. 11	26	Sept. 26-Oct. 21.
1888	31	Oct. 24-Nov. 23	31	Oct. 24-Nov. 23.
1889	10	Dec. 1-Dec. 10	17	Jan. 15-Jan. 31.
1890	16	Mar. 22-Apr. 6	20	Feb. 23-Mar. 14.
1891	16	Dec. 1-Dec. 16		
	25	Dec. 1-Dec. 25	34	Jan. 16-Feb. 18.
	19	Oct. 22-Nov. 9	20	Oct. 22-Nov. 10.
Means	17		23	

¹ October 17-October 31 (15); November 12-November 26 (15).

² January 1-January 25.

³ November 6-November 30.

⁴ December 9-December 31 (23).

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Maximum period of drought expressed by the greatest consecutive number of days, etc.—Continued.

MOORHEAD, MINN.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1881	9	{ Mar. 1-Mar. 9 Oct. 19-Oct. 27 July 1-July 9 Dec. 10-Dec. 18 }	16	July 16-July 31.
1882	11	Aug. 8-Aug. 18	19	Aug. 1-Aug. 19.
1883	13	June 18-June 30	25	June 16-July 10.
1884	13	{ Oct. 6-Oct. 18 Aug. 3-Aug. 15 }	15	Aug. 3-Aug. 17.
1885	10	Sept. 18-Sept. 27	29	Jan. 1-Jan. 29.
1886	13	May 17-May 29	19	{ Mar. 20-Apr. 7. Nov. 3-Nov. 21.
1887	18	{ Oct. 21-Nov. 7 Sept. 13-Sept. 30 }	18	{ Oct. 21-Nov. 7. Sept. 13-Sept. 30.
1888	11	Nov. 17-Nov. 27	14	Nov. 17-Nov. 30.
1889	11	{ Oct. 1-Oct. 11 Apr. 4-Apr. 14 }	29	Nov. 1-Nov. 29.
1890	21	{ Nov. 10-Nov. 30 Dec. 4-Dec. 24 }	28	Dec. 3-Dec. 30.
1891	12	Oct. 18-Oct. 29	13	Oct. 18-Oct. 30.
Means	13	.....	20	

ST. VINCENT, MINN.

1881	12	Apr. 3-Apr. 14	22	Apr. 2-Apr. 23.
1882	15	Apr. 10-Apr. 24	16	{ Nov. 7-Nov. 22. Apr. 10-Apr. 25.
1883	13	Sept. 7-Sept. 19	22	Mar. 10-Mar. 31.
1884	21	May 1-May 21	21	May 1-May 21.
1885	12	Sept. 16-Sept. 27	15	Sept. 16-Sept. 30.
1886	17	Dec. 1-Dec. 17	20	Nov. 2-Nov. 21.
1887	14	Oct. 24-Nov. 6	27	Oct. 20-Nov. 15.
1888	12	Aug. 20-Aug. 31	24	May 4-May 27.
1889	12	Feb. 17-Feb. 28	26	Sept. 26-Oct. 21.
1890	17	Nov. 13-Nov. 29	29	Nov. 1-Nov. 29.
1891	14	Dec. 6-Dec. 19	20	Aug. 22-Sept. 10.
Means	14	.....	22	

HAY SPRINGS, NEBR.

1886	11	Sept. 16-Sept. 26	13	Aug. 14-Aug. 26.
1887	15	Jan. 7-Jan. 21	22	Nov. 1-Nov. 22.
1888	17	Sept. 14-Sept. 30	40	Aug. 22-Sept. 30.
1889	17	Dec. 11-Dec. 27	23	Aug. 20-Sept. 11.
1890	27	² Dec. 4-Dec. 30	30	Sept. 1-Sept. 30.
1891	18	Dec. 3-Dec. 20	27	Apr. 21-May 17.
Means	18	.....	26	

¹ November 16-December 16 (31).

² 19 in October and 16 in November.

FORT ROBINSON, NEBR.

1884	19	Mar. 1-Mar. 19	19	Mar. 1-Mar. 19.
1885	35	Feb. 9-Mar. 15	35	Feb. 9-Mar. 15.
1886	29	Sept. 2-Sept. 30	29	Sept. 2-Sept. 30.
1887	24	Oct. 24-Nov. 16	24	² Oct. 24-Nov. 16.
1888	39	Nov. 16-Dec. 24	71	Aug. 22-Oct. 3.
1889	37	Nov. 21-Dec. 27	40	Mar. 1-Apr. 9.

¹ August 4-August 31 (28).

² June 8-June 29 (22); March 5-March 25 (21).

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Maximum period of drought expressed by the greatest consecutive number of days, etc.—Continued.

FORT ROBINSON, NEBR.—Continued.

Year.	Excluding traces.		Including traces.	
	No. of days.	Dates (inclusive).	No. of days.	Dates (inclusive).
1890	30	¹ Sept. 1-Sept. 30	30	¹ Sept. 1-Sept. 30.
1891	26	Oct. 12-Nov. 6	26	¹ Dec. 1-Dec. 30. Oct. 12-Nov. 6.
Means	30	.....	34	

¹ December 2-December 30 (29).

VALENTINE, NEBR.

1886	16	July 1-July 16	17	July 1-July 17.
1887	30	Oct. 24-Nov. 22	32	Oct. 24-Nov. 24.
1888	17	{Apr. 10-Apr. 26}	17	{Apr. 10-Apr. 26.
1889	23	{Jan. 1-Jan. 17}	37	{Jan. 1-Jan. 17.
1890	24	Nov. 28-Dec. 20	37	¹ Nov. 14-Dec. 20.
1891	24	Dec. 7-Dec. 30	28	Dec. 3-Dec. 30.
Means	35	² Oct. 6-Nov. 9	38	³ Oct. 6-Nov. 12.
	24	.....	28	.....

¹ August 1-August 31 (31); Feb. 16-March 19 (32).

² September 1-September 22 (22).

³ December 4-December 23 (20).

SIOUX CITY, IOWA.

1858	25	Dec. 7-Dec. 31	25	Dec. 7-Dec. 31.
1861	27	¹ July 23-Aug. 18	28	Feb. 1-Feb. 28.
1862	51	² Oct. 11-Nov. 30	51	³ Oct. 11-Nov. 30.
1890	26	Dec. 5-Dec. 26	26	Dec. 5-Dec. 30.
1891	12	{Sept. 12-Sept. 23}	19	Oct. 22-Nov. 9.
Means	28	{Oct. 22-Nov. 2}	30	

¹ March 8-March 31 (24).

² December 13, 1862-January 22, 1863 (41).

³ March 13-April 15 (23).

APPENDIX No. 83.

Depth of evaporation, in inches, as measured by the Piche evaporimeter, for the year ending June 30, 1888.

[Observations made in Weather Bureau thermometer shelters and values computed from the means of the tridaily determinations of the dew-point and wet-bulb readings by Prof. Thomas Russell, Weather Bureau.]

Station.	1888.	1888.	1888.	1888.	1888.	1888.	1887.	1887.	1887.	1887.	1887.	1887.	Year.
Bismarek, N. Dak.....	0.4	0.6	0.6	3.0	4.3	4.1	5.6	4.2	4.0	2.6	1.2	0.4	31.0
Fort Buford, N. Dak.....	1.4	0.7	0.6	3.0	4.7	5.0	6.2	4.9	4.8	3.0	1.7	0.5	35.5
Huron, S. Dak.....	0.3	0.7	0.8	3.7	3.7	4.1	5.7	4.2	4.1	3.1	2.4	0.7	33.0
Moorhead, Minn.....	0.2	1.4	0.5	2.1	3.6	3.8	3.7	3.3	3.5	2.4	1.3	0.5	26.3
Poplar River, Mont.....	0.4	0.8	0.8	2.7	4.9	5.7	6.0	4.8	4.4	2.5	1.7	0.7	35.4
Fort Sully, S. Dak.....	0.6	0.9	1.3	4.4	4.1	5.2	7.7	4.9	5.7	3.6	2.8	0.7	41.9
St. Vincent, Minn.....	0.3	0.3	0.5	1.8	3.8	3.9	3.1	2.6	2.6	2.0	0.9	0.3	22.1
Fort Totten, N. Dak.....	0.2	0.3	0.4	2.2	4.6	3.8	4.2	3.7	3.7	2.3	1.4	0.4	27.2
Valentine, Nebr.....	1.2	1.6	1.8	5.0	3.2	5.3	6.9	5.0	5.2	3.8	3.3	1.5	43.8
Yankton, S. Dak.....	0.4	1.4	1.2	3.3	3.1	4.4	4.6	3.7	2.9	3.0	2.2	0.8	31.0

APPENDIX No. 84.

Monthly and annual mean relative humidity.

[Expressed in percentages. Complete saturation at the existing temperature at time of observation is assumed as 100.]

Station.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.	Length of record.
Bismarek, N. Dak...	80	81	78	68	65	69	65	65	65	67	76	78	71	Sept., 1874-Dec., 1891.
Fort Buford, N. Dak...	79	79	77	65	60	66	63	61	62	68	77	79	70	1879-1891.
Fort Totten, N. Dak...	80	82	83	75	63	74	75	73	70	71	80	82	76	June, 1884-Jan., 1889.
Fort Bennett, S. Dak...	73	73	72	67	67	70	67	65	63	65	72	74	69	Oct., 1880-Nov., 1885.
Deadwood, S. Dak...	70	70	70	70	67	67	64	63	63	65	67	70	67	1878-1887.
Huron, S. Dak.....	73	75	73	66	65	72	72	68	67	69	71	70	70	July, 1881-Dec., 1891.
Rapid City, S. Dak...	70	72	69	56	58	59	54	51	50	55	63	63	60	1888-1891.
Fort Sully, S. Dak...	76	75	73	61	58	65	58	62	58	63	66	76	66	Dec., 1885-June, 1891.
Yankton, S. Dak....	71	71	70	65	66	71	71	71	69	66	69	72	69	Apr., 1873-Dec., 1891.
Moorhead, Minn....	84	82	79	71	64	71	74	73	72	72	80	83	75	1881-1891.
St. Vincent, Minn....	86	84	83	77	69	73	78	79	78	77	79	83	79	1881-1891.
Means.....	77	77	75	67	64	69	67	67	65	67	73	76	64	

APPENDIX No. 85.

Percentages of mean cloudiness.

[Total cloudiness, 100; absence of clouds, zero (0).]

Station.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.	Length of record.
Bismarek, N. Dak.	42	48	53	52	52	48	42	37	38	47	48	50	47	Oct., 1874-Dec., 1891.
Buford, Fort, N. Dak.	52	52	57	54	54	55	48	40	44	54	51	52	52	Feb., 1879-Dec., 1891.
Deadwood, S. Dak.	41	45	48	52	49	44	35	32	35	38	40	45	41	Jan., 1878-Dec., 1887.
Huron, S. Dak.	44	46	55	50	48	47	43	41	39	49	45	50	45	July, 1881-Dec., 1891.
Moorhead, Minn.	45	51	54	50	50	52	46	41	45	55	53	52	49	1881-1891.
Pembina, N. Dak.	51	52	48	50	52	55	39	46	48	56	56	56	51	1873-1880.
St. Vincent, Minn.	42	44	46	48	46	47	45	40	46	55	52	45	46	1881-1891.
Sully, Fort, S. Dak.	41	48	52	49	49	50	41	38	33	38	33	48	43	Dec., 1885-June, 1891.
Totten, Fort, N. Dak.	37	45	52	53	44	49	41	39	39	49	45	48	44	June, 1884-Dec., 1888.
Yankton, S. Dak.	42	48	52	49	53	48	42	41	40	43	44	48	46	Apr., 1873-Dec., 1891.
Means	44	48	52	51	50	50	42	40	41	48	47	49	46	

APPENDIX No. 86.

Percentages of clear weather (sunshine), expressed as the complement of mean cloudiness.

Station.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.	Length of record.
Bismarek, N. Dak.	58	52	47	48	48	52	58	63	62	53	52	50	53	Oct., 1874-Dec., 1891.
Buford, Fort, N. Dak.	48	48	43	46	46	45	52	60	56	46	49	48	48	Feb., 1879-Dec., 1891.
Deadwood, S. Dak.	59	55	52	48	51	56	65	68	65	62	60	55	59	Jan., 1878-Dec., 1887.
Huron, S. Dak.	56	54	45	50	52	53	57	59	61	51	55	50	55	July, 1881-Dec., 1891.
Moorhead, Minn.	55	49	46	50	50	48	54	59	55	45	47	48	51	1881-1891.
Pembina, N. Dak.	49	48	52	50	48	45	61	54	52	44	44	44	49	1873-1880.
St. Vincent, Minn.	58	56	54	52	54	53	55	60	54	45	48	55	54	1881-1891.
Sully, Fort, S. Dak.	59	52	48	51	51	50	59	62	67	62	67	52	57	Dec., 1885-June, 1891.
Totten, Fort, N. Dak.	63	55	48	47	56	51	59	61	61	51	55	52	56	June, 1884-Dec., 1888.
Yankton, S. Dak.	58	52	48	51	47	52	58	59	60	57	56	52	54	Apr., 1873-Dec., 1891.
Means	56	52	48	49	50	50	58	60	59	52	53	51	54	

APPENDIX No. 87.

Average hourly velocity of the wind, in miles per hour; computed from the records of self-registering instruments. Nine years, 1883-1891.

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
Bismarck, N. Dak	7	9	9	10	10	10	8	8	9	9	8	8	9
Butford, Fort, N. Dak	8	9	9	10	10	9	9	8	9	9	8	8	9
Huron, S. Dak	10	10	10	12	11	11	9	9	11	11	10	10	10
Moorhead, Minn	10	10	11	13	12	11	8	9	11	10	10	10	10
St. Vincent, Minn	9	10	10	10	10	9	7	8	9	9	9	9	9
Sully, Fort, S. Dak	8	9	10	11	10	11	9	9	10	10	8	8	9
Yankton, S. Dak	8	9	9	10	10	8	7	6	8	9	8	8	8
Means	9	9	10	12	10	10	8	8	10	10	9	9	10

APPENDIX No. 88.

Mean wind direction, computed from the eight cardinal points, true direction, for fifteen years. "Hazen's Tables."

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
Bismarck, N. Dak.....	N. 24° W.	N. 7° W.	N. 5° E.	N. 34° E.	N. 48° E.	N. 60° E.	N. 58° E.
Butford, Fort, N. Dak.....	N. 71° W.	N. 71° W.	N. 30° W.	N. 35° E.	N. 14° E.	S. 89° E.	N. 39° E.
Deadwood, S. Dak.....	S. 48° W.	S. 47° W.	S. 2° E.	S. 32° E.	S. 52° W.	S. 9° W.	N. 69° E.
Moorhead, Minn.....	N. 70° W.	N. 34° W.	N. 12° W.	N. 24° E.	N. 83° E.	S. 30° E.	S. 51° E.
St. Vincent, Minn.....	N. 85° W.	N. 79° W.	N. 60° W.	N. 30° W.	N. 37° W.	S. 54° W.	N. 89° W.
Sully, Fort, S. Dak.....	N. 32° W.	N. 8° W.	N. 19° E.	N. 26° E.	S. 85° E.	S. 84° E.	S. 56° E.
Yankton, S. Dak.....	N. 57° W.	N. 51° W.	N. 20° W.	N. 2° W.	S. 89° E.	S. 23° E.	S. 31° E.

Station.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Bismarck, N. Dak.....	N. 50° E.	N. 11° W.	N. 13° W.	N. 18° W.	N. 30° W.	N. 4° E.
Butford, Fort, N. Dak.....	N. 57° E.	N. 14° W.	N. 61° W.	N. 88° W.	N. 85° W.	N. 41° W.
Deadwood, S. Dak.....	S. 49° E.	N.	N. 31° E.	S. 38° W.	N. 87° W.	S. 34° W.
Moorhead, Minn.....	S. 58° E.	S. 58° W.	N. 84° W.	N. 69° W.	N. 81° W.	N. 24° W.
St. Vincent, Minn.....	S. 69° W.	S. 72° W.	S. 85° W.	N. 69° W.	N. 86° W.	N. 81° W.
Sully, Fort, S. Dak.....	S. 69° E.	N. 41° E.	N. 14° W.	N. 32° W.	N. 27° W.	N. 24° W.
Yankton, S. Dak.....	S. 35° E.	S. 64° W.	N. 85° W.	N. 55° W.	N. 54° W.	N. 58° W.

APPENDIX No. 89.

Average number of times northerly and southerly winds observed.

[Northerly includes NE. to NW.; southerly includes SE. to SW. Observations made three times daily prior to July, 1888, after which they were made twice daily, at 8 a. m. and 8 p. m., seventy-fifth meridian time.]

Station.	Jan.		Feb.		Mar.		Apr.		May.		June.		July.		Aug.	
	N.	S.	N.	S.	N.	S.	N.	S.	N.	S.	N.	S.	N.	S.	N.	S.
Bismarck, N. Dak.	43	14	44	15	43	20	41	23	41	24	33	26	35	25	37	24
Buford, Fort, N. Dak.	29	20	31	19	37	19	36	19	35	24	29	24	31	20	33	20
Pembina, N. Dak.	37	34	37	28	43	31	44	23	42	34	37	34	30	38	32	35
Stevenson, Fort, N. Dak.	41	20	37	16	36	23	33	19	33	27	26	26	30	27	27	33
Totten, Fort, N. Dak.	46	25	42	25	44	31	43	30	45	27	29	41	40	31	33	37
Bennett, Fort, S. Dak.	43	18	43	17	49	24	42	29	39	37	30	46	33	37	36	42
Deadwood, S. Dak.	27	46	26	39	32	38	30	38	32	36	30	38	30	40	29	35
Huron, S. Dak.	44	30	39	26	47	27	40	32	43	32	28	42	31	40	32	41
Rapid City, S. Dak.	33	12	27	14	33	18	32	19	32	22	31	23	20	24	18	23
Sully, Fort, S. Dak.	34	9	30	13	39	17	35	24	37	23	28	29	25	24	24	24
Yankton, S. Dak.	42	24	39	22	44	23	40	31	34	34	28	39	26	39	25	37
Sioux City, Iowa.	28	28	28	18	33	14	24	22	18	30	20	22	25	27	19	30
Valentine, Nebr.	35	19	29	20	35	24	34	26	37	26	28	31	23	35	23	36
St. Vincent, Minn.	39	33	37	29	41	30	38	30	42	30	30	37	34	31	32	31
Moorhead, Minn.	41	29	40	28	44	26	41	32	42	32	31	41	34	35	33	37
Means	37	24	35	22	40	34	37	26	37	29	29	33	30	32	29	32

Station.	Sept.		Oct.		Nov.		Dec.		Length of record (inclusive).
	N.	S.	N.	S.	N.	S.	N.	S.	
Bismarck, N. Dak.	37	21	39	21	40	20	43	16	Sept., 1874-Dec., 1891.
Buford, Fort, N. Dak.	34	18	32	23	26	24	27	22	Jan., 1879-Dec., 1891.
Pembina, N. Dak.	36	33	40	31	39	34	41	36	Jan., 1873-Aug., 1880.
Stevenson, Fort, N. Dak.	27	28	40	19	40	21	38	17	Feb., 1879-Feb., 1883.
Totten, Fort, N. Dak.	32	33	40	31	37	30	44	23	June, 1884-Dec., 1888.
Bennett, Fort, S. Dak.	34	32	46	29	46	24	49	19	Sept., 1880-Nov., 1885.
Deadwood, S. Dak.	31	30	31	26	26	34	31	30	Jan., 1878-Dec., 1887.
Huron, S. Dak.	31	38	35	37	36	32	41	31	July, 1881-Dec., 1891.
Rapid City, S. Dak.	26	16	23	16	29	12	26	14	Jan., 1888-Dec., 1891.
Sully, Fort, S. Dak.	27	17	28	18	30	11	36	14	Dec., 1885-Dec., 1891.
Yankton, S. Dak.	29	32	37	31	40	25	42	26	Apr., 1873-Dec., 1891.
Sioux City, Iowa.	17	32	29	23	29	22	22	27	July, 1889-Dec., 1891.
Valentine, Nebr.	26	30	32	28	30	23	31	24	Sept., 1885-Dec., 1891.
St. Vincent, Minn.	27	31	34	35	37	32	38	32	Sept., 1880-Dec., 1891.
Moorhead, Minn.	30	36	32	37	35	33	36	33	Jan., 1881-Dec., 1891.
Means	30	28	34	27	35	25	36	24	

APPENDIX No. 90.

Maximum and average wind velocities, in miles per hour, with the attendant prevailing directions.

BISMARCK, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.
1885	29 NW.	30 NW.	48 NW.	36 S.	38 S.	43 E.
1886	27 NW.	39 NE.	37 NW.	42 N.	31 E.	28 NE.
1887	30 NW.	40 NW.	44 NW.	40 NE.	40 N.	39 S.
1888	54 NW.	51 NW.	50 NW.	48 NW.	48 NW.	48 N.
1889	48 NW.	56 N.	48 NW.	70 W.	42 S.	46 S.
1890	36 W.	64 NW.	54 NW.	50 NW.	60 NW.	52 SE.
1891	48 NW.	48 NW.	36 NW.	48 NW.	42 SE.	54 NE.
Means	39 NW.	47 NW.	45 NW.	48 N'ly.	43 S. NW.	44 S. NE.

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885	29 NW.	30 NW.	29 N.	32 NW.	24 N.	47 NW.
1886	28 NW.	48 N.	40 NW.	33 NW.	53 NW.	45 NW.
1887	37 N.	36 W.	36 NW.	48 NW.	59 NW.	44 NW.
1888	47 NW.	32 NW.	37 NW.	50 NW.	48 NW.	42 NW.
1889	36 S.	41 NW.	46 N.	36 NW.	48 NW.	40 NW.
1890	48 E.	46 NW.	42 NW.	52 W.	48 N.	58 NW.
1891	48 NE.	38 NW.	40 SE.	54 NW.	50 NW.	42 NW.
Means	38 N'ly.	39 NW.	39 NW.	44 NW.	47 NW.	45 NW.

FORT BUFORD, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.
1885	34 W.	50 W.	58 W.	50 W.	32 NW.	56 NE.
1886	40 NW.	46 NW.	52 W.	36 NW.	46 W.	36 W.
1887	47 W.	33 W.	57 W.	43 NW.	46 NW.	52 NW.
1888	48 NW.	46 W.	46 NW.	48 NW.	36 E.	46 W.
1889	38 NW.	52 NW.	35 NW.	66 NW.	36 SE.	36 NW.
1890	36 W.	72 NW.	60 NW.	44 NW.	51 NW.	56 NW.
1891	38 NW.	40 NW.	48 NW.	42 NW.	34 NE.	48 NW.
Means	40 NW.	48 NW.	51 NW.	47 NW.	41 N'ly.	47 NW.

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885	50 W.	32 E.	32 SW.	32 NW.	33 W.	60 W.
1886	48 W.	40 W.	48 W.	30 NW.	52 NW.	50 W.
1887	48 NW.	48 NE.	35 NW.	50 NW.	60 NW.	50 NW.
1888	54 NW.	30 NW.	42 NW.	60 NW.	36 NW.	42 NW.
1889	38 N.	48 NW.	48 NW.	42 NW.	40 NW.	37 NW.
1890	40 NW.	46 N.	34 NW.	60 W.	42 NW.	60 NW.
1891	36 N.	42 NW.	36 N.	36 NW.	46 W.	36 SW.
Means	45 N'ly.	41 N'ly.	39 N'ly.	44 NW.	44 NW.	48 NW.

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Maximum and average wind velocities, in miles per hour, etc.—Continued.

FORT TOTTEN, N. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.
1885	45 W.	41 W.	52 W.	54 NW.	41 NW.	46 SE.
1886	43 S.	56 NW.	40 SW.	42 SE.	42 W.	40 E.
1887	60 NW.	48 S.	64 NW.	42 S.	52 S.	54 NW.
1888	52 S.	50 S.	58 N.	54 NW.	40 S.	60 E.
1889	36 N. NW.					
Means	47 N'y.	49 S.	54 N'y.	48 NW.	44 S.	50 E.

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885	53 NE.	37 SE.	40 NW.	40 SW.	36 SE.	48 NW.
1886	32 NW.	52 NW.	48 NW.	45 NW.	64 NW.	50 SW.
1887	60 W.	54 W.	50 W.	50 NW.	45 NW.	42 NW.
1888	48 SE.	36 SE.	46 NW.	48 NW.	46 NW.	38 NW.
Means	48 N'y.	45 SE.	46 NW.	46 NW.	48 NW.	44 NW.

HURON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.
1885	27 S.	28 NW.	37 NW.	33 SE.	34 SW.	42 SE.
1886	34 NW.	38 NW.	44 NW.	38 NW.	27 SW.	30 SW.
1887	30 NW.	33 NW.	40 NW.	45 SW.	49 NW.	39 NW.
1888	60 NW.	47 NW.	45 NW.	84 SW.	36 NW.	45 SE.
1889	42 NW.	60 NW.	38 NW.	60 NW.	48 SE.	39 S.
1890	38 SE.	45 NW.	45 NW.	40 S.	50 N.	60 N.
1891	36 N.	48 N.	35 NE.	42 NW.	50 S.	56 SE.
Means	38 NW.	43 NW.	41 NW.	45 S'y.	42 S'y.	44 S'y.

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885	39 NW.	25 NW.	31 SE.	37 S.	38 NE.	39 NW.
1886	32 S.	40 NE.	34 SE.	34 SW.	42 NW.	31 NW.
1887	66 SE.	39 SE.	42 SE.	38 NW.	54 NW.	48 N.
1888	40 NE.	47 SW.	38 NW.	40 NW.	30 W.	32 NW.
1889	45 SE.	42 S.	42 S.	33 SE.	36 NW.	44 NW.
1890	36 S.	42 NW.	38 NW.	42 NW.	34 NW.	48 NW.
1891	44 NW.	44 NW.	63 SE.	66 SE.	46 SE.	46 NW.
Means	43 S'y.	40 N'y.	41 S'y.	41 S'y.	40 NW.	41 NW.

RAPID CITY, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.
1885 ¹	22 SW.	15 E.	16 NE.	18 NE.	20 SW.	25 SW.
1886 ¹	33 SW.	21 SW.	26 SW.	26 SW.	16 SW.	17 NE.
1887 ¹	34 SW.	32 SW.		23 NE.	24 SW.	34 S.
1888	29 N.	42 W.	36 N.	46 SW.	38 N.	44 SW.
1889	42 N.	52 N.	36 NW.	48 N. NW.	36 W. SE.	36 N.
1890	48 W.	48 NE.	42 NW.	60 N.	38 N.	59 SW.
1891	36 NW.	42 NW.	42 NW.	39 NW.	36 SW.	44 SW.
Means	35 SW.	36 N'y.	33 N'y.	37 N'y.	30 S'y.	37 S'y.

¹ Observations made at Deadwood.

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

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Maximum average and wind velocities, in miles per hour, etc.—Continued.

RAPID CITY, S. DAK.—Continued.

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885 ¹	18 SW.	20 SW.	16 NE.	16 NE.	24 SW.	30 W.
1886 ¹	23 SW.	17 S.	18 S.	21 SW.	14 SW.	23 SW.
1887 ¹	32 W.	24 S.	24 SW.	30 NW.	25 NW.	20 SW.
1888	36 SW.	48 S.	48 NW.	40 N.	40 N.	42 N.
1889	60 N.	36 N.	48 NW.	46 W.	36 NW.	47 SW.
1890	36 SE.	60 SW.	35 S.	38 NW.	36 NW.	42 N.
1891	57 NW.	36 W.	38 NW.	42 W.	47 NW.	48 SW.
Means	37 S'ly.	34 S'ly.	32 N'ly.	33 N'ly.	32 N'ly.	36 SW.

¹ Observations made at Deadwood.

FORT SULLY, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.
1885	38 NW. ¹	36 NW. ¹	48 NW. ¹	42 S. ¹	40 N. ¹	44 W. ¹
1886	44 N.	44 NW.	44 NW.	44 SE.	37 SW.	39 SE.
1887	54 NW.	44 NW.	52 NW.	48 NW.	56 NE.	42 SE.
1888	54 W.	41 W.	36 NW.	47 NW.	45 E.	50 W.
1889	45 NW.	66 NW.	41 NE.	60 NW.	36 W. NE.	34 NE.
1890	36 NW.	43 NW.	46 NW.	54 NE.	52 N.	66 W.
1891	46 NW.	52 NW.	38 N.	47 NW.	58 SW.	50 SE.
Means	45 NW.	47 NW.	44 NW.	49 NW.	46 N'ly.	46 W. SE.

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885	44 NW. ¹	35 SE. ¹	29 N. ¹	40 NW. ¹	44 N. ¹	58 N. ¹
1886	36 SE.	46 SE.	42 NW.	36 SE.	48 NW.	40 NW.
1887	47 S.	48 E.	42 W.	44 W.	52 W.	43 W.
1888	36 NE.	48 NW.	44 NW.	42 W.	36 NW.	36 NW.
1889	46 NW.	38 W.	50 NW.	31 NW.	36 NW.	42 NW.
1890	42 NW.	56 NW.	40 NW.	42 NW.	42 NW.	54 NW.
1891	35 SW. ²	38 W. ²	38 NW. ²	42 W. ²	42 NW. ²	36 NW. ²
Means	41 N'ly.	44 W. SE. NW.	41 NW.	40 W. NW.	43 NW.	44 NW.

¹ Observations at Fort Bennett.

² Observations at Pierre.

YANKTON, S. DAK.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.
1885	32 SW.	27 N.	33 N.	41 N.	36 S.	44 SE.
1886	39 NW.	36 NW.	38 NW.	39 SW.	32 NE.	30 S.
1887	38 NW.	40 NW.	46 NW.	46 S.	40 NW.	28 SE.
1888	54 NW.	36 NW.	36 N.	48 S.	36 S.	36 NW.
1889	41 NW.	60 NW.	32 NW.	48 NW.	56 S.	52 W.
1890	31 S.	39 N.	48 NW.	48 NW.	54 S.	70 SE.
1891	45 NW.	46 NW.	32 NW.			57 S.
Means	40 NW.	41 NW.	38 NW.	45 S. NW.	42 S.	45 S'ly.

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885	22 NW.	38 NE.	37 E.	28 NW.	36 NW.	44 NW.
1886	30 S.	32 S.	32 S.	37 S.	37 N.	36 N.
1887	54 NW.	45 S.	30 E.	33 S.	44 W.	34 N.
1888	34 N.	36 NW.	28 NW.	32 NW.	26 NW.	25 NW.
1889	48 NE.	36 W.	27 NW.	31 NW.	29 NW.	45 N.
1890	47 SW.	38 SW.	40 NW.	39 NW.	39 S.	54 NW.
1891	50 N.	42 NE.	48 SE.	36 SE.	38 NW.	35 NW.
Means	41 N'ly.	38 S. NE.	35 NW.	34 NW.	36 N'ly.	39 N'ly.

CERTAIN CLIMATIC FEATURES OF THE TWO DAKOTAS.

Maximum and average wind velocities, in miles per hour, etc.—Continued.

MOORHEAD, MINN.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.
1885	38 S.	29 N.	44 N.	40 NW.	40 N.	42 SE.
1886	38 S.	44 S.	38 N.	46 SE.	44 S.	36 SE.
1887	49 S.	45 SE.	41 S.	49 S.	61 SE.	49 S.
1888	50 S.	50 S.	50 S.	54 SE.	38 SE.	60 S.
1889	37 N.	40 S.	36 NW.	46 S.	50 SE.	48 S.
1890	42 S.	48 N.	50 S.	46 S.	44 NE.	38 SE.
1891	38 S.	36 SE.	36 SE.	45 E.	36 SE.	44 SE.
Means	42 S.	42 S'ly.	42 S'ly.	47 S'ly.	45 S'ly.	45 S'ly.

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885	51 N.	40 SE.	48 S.	42 S.	32 N.	50 S.
1886	36 NW.	36 SW.	50 S.	44 S.	48 NW.	34 NW.
1887	60 NW.	42 S.	48 SE.	38 SE.	42 N.	38 NW.
1888	42 SE.	51 S.	48 S.	36 SE.	33 S.	38 S.
1889	48 S.	42 S.	50 S.	33 S.	30 N.	34 SE.
1890	75 NW.	40 S.	36 SE.	36 W.	35 NW.	44 NW.
1891	36 SE.	46 SW.	54 SW.	52 SE.	32 SE.	42 NW.
Means	50 N'ly.	43 S'ly.	48 S'ly.	40 S'ly.	36 N'ly.	40 NW.

ST. VINCENT, MINN.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.
1885	40 S.	29 NW.	42 N.	41 NW.	40 NW.	32 N.
1886	33 S.	45 NW.	39 W.	36 SE.	35 W.	28 S.
1887	44 S.	32 NW.	45 S.	30 S.	38 NW.	26 S.
1888	48 NW.	48 S.	54 NW.	40 S.	42 W.	44 S.
1889	38 NW.	38 N.	38 NW.	44 S.	44 S.	38 S.
1890	30 N.	40 NW.	38 NW.	38 SE.	40 W.	32 S.
1891	36 NE.	35 N.	36 SE.	40 SE.	44 S.	46 S.
Means	38 N'ly.	38 N'ly.	42 N'ly.	38 S'ly.	40 W.	35 S.

Year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885	32 N.	28 NW.	34 W.	36 S.	30 S.	41 S.
1886	27 S.	39 NW.	39 NW.	30 S.	46 W.	39 N.
1887	36 N.	30 S.	48 S.	42 NW.	37 NW.	38 N.
1888	29 NW.	34 NW.	34 NW.	30 SW.	30 S.	36 NW. S.
1889	40 W.	36 S.	50 S.	36 NW.	40 N.	36 S.
1890	28 SE.	35 NW.	36 NW.	30 S.	36 NW.	36 W.
1891	42 E.	42 SE.	41 SE.	43 SE.	36 S.	48 N.
Means	33 N'ly.	35 N'ly.	40 NW.	35 S'ly.	36 S.	39 N'ly.

APPENDIX No. 91.

Monthly mean temperature of the dewpoint.

Station.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Length of record.
Bismarck, N. Dak.	-1	3	16	33	41	54	57	54	44	34	21	9	1882-1891.
Fort Buford, N. Dak.	-2	2	16	29	36	50	52	49	40	32	20	9	1882-1891.
Huron, S. Dak.	0	5	18	33	42	56	59	56	46	33	19	9	1882-1891.
Rapid City, S. Dak.	9	12	19	29	36	47	50	49	38	29	20	21	1888-1891.
Fort Sully, S. Dak.	2	7	19	35	41	54	58	54	42	32	20	14	Dec., 1885-June, 1891. ¹
Yankton, S. Dak.	5	11	21	35	44	58	62	59	51	37	24	16	1882-1891.
Moorhead, Minn.	-5	-1	13	32	39	54	58	54	45	33	19	7	1882-1891.
St. Vincent, Minn.	-12	-6	10	30	39	53	57	54	44	33	16	3	1882-1890.
Deadwood, S. Dak.	13	14	24	31	39	49	53	51	43	33	25	17	{Oct., 1891-Dec., 1891. ¹
Fort Bennett, S. Dak.	4	8	22	33	43	56	58	56	45	34	23	11	Jan., 1882-Dec., 1887. ¹
Fort Totten, N. Dak.	-10	-4	11	30	38	54	57	53	42	31	18	3	Jan., 1882-Nov., 1885. ¹
Valentine, Nebr.	7	11	19	32	42	53	57	55	44	33	22	17	June, 1884-Jan., 1889. ¹
Sioux City, Iowa	14	7	18	33	39	53	60	55	46	35	21	22	Sept., 1885-Dec., 1891. ¹
Means	2	5	17	32	40	53	57	54	44	33	21	12	July, 1889-Dec., 1891. ¹

¹ Inclusive.

APPENDIX No. 92.

Normal absolute humidity. Expressed as the weight of vapor in grains troy per cubic foot of saturated air, computed from "Hazen's Tables."

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
Bismarck, N. Dak.	0.52	0.62	1.09	2.21	2.97	4.70	5.20	4.70
Fort Buford, N. Dak.	0.49	0.59	1.09	1.89	2.47	4.09	4.38	3.95
Huron, S. Dak.	0.54	0.68	1.19	2.21	3.08	5.03	5.57	5.03
Rapid City, S. Dak.	0.81	0.92	1.24	1.89	2.47	3.68	4.09	3.95
Fort Sully, S. Dak.	0.59	0.74	1.24	2.38	2.97	4.70	5.38	4.70
Yankton, S. Dak.	0.68	0.88	1.35	2.38	3.31	5.38	6.15	5.57
Moorhead, Minn.	0.40	0.52	0.96	2.13	2.76	4.70	5.38	4.70
St. Vincent, Minn.	0.20	0.37	0.84	1.97	2.76	4.54	5.20	4.70
Deadwood, S. Dak.	0.96	1.00	1.54	2.05	2.76	4.09	4.54	4.23
Fort Bennett, S. Dak.	0.65	0.77	1.41	2.21	3.19	5.03	5.38	5.03
Fort Totten, N. Dak.	0.25	0.43	0.88	1.97	2.66	4.70	5.20	4.54
Valentine, Nebr.	0.74	0.88	1.24	2.13	3.08	4.54	5.20	4.86
Sioux City, Iowa	1.00	0.74	1.19	2.21	2.76	4.54	5.76	4.86
Means	0.60	0.70	1.17	2.13	2.86	4.59	5.18	4.86

Station.	Sept.	Oct.	Nov.	Dec.	Length of record.
Bismarck, N. Dak.	3.31	2.29	1.35	0.81	1882-1891.
Fort Buford, N. Dak.	2.86	2.13	1.30	0.81	1882-1891.
Huron, S. Dak.	3.55	2.21	1.24	0.81	1882-1891.
Rapid City, S. Dak.	2.66	1.89	1.30	1.35	1888-1891.
Fort Sully, S. Dak.	3.08	2.13	1.30	1.00	Dec., 1885-June, 1891. ¹
Yankton, S. Dak.	4.23	2.56	1.54	1.09	1882-1891.
Moorhead, Minn.	3.43	2.21	1.24	0.74	1882-1891.
St. Vincent, Minn.	3.31	2.21	1.09	0.62	{Jan., 1882-Dec., 1890. ¹
Deadwood, S. Dak.	3.19	2.21	1.61	1.14	{Oct., 1891-Dec., 1891. ¹
Fort Bennett, S. Dak.	3.43	2.29	1.48	0.88	Jan., 1882-Dec., 1887. ¹
Fort Totten, N. Dak.	3.08	2.05	1.19	0.62	Jan., 1882-Nov., 1885. ¹
Valentine, Nebr.	3.31	2.21	1.41	1.14	June, 1884-Jan., 1889. ¹
Sioux City, Iowa	3.55	2.38	1.35	1.41	Sept., 1885-Dec., 1891. ¹
Means	3.30	2.21	1.34	0.96	July, 1889-Dec., 1891. ¹

¹ Inclusive.

APPENDIX No. 93.

Table showing the average yield per acre and price per bushel of corn, wheat, oats, and potatoes, and the price per head of horses, mules, milch cows, oxen and other cattle, sheep and hogs, for the years 1882 to 1891.

NORTH AND SOUTH DAKOTA.

Year.	Average yield per acre.				Average price per bushel.				Average price per head.					
	Corn.	Wheat.	Oats.	Potatoes.	Corn.	Wheat.	Oats.	Potatoes.	Horses.	Mules.	Milch cows.	Oxen and other cattle.	Sheep.	Hogs.
	<i>Bush.</i>	<i>Bush.</i>	<i>Bush.</i>	<i>Bush.</i>										
1882	25.0	15.9	25.7	106.5	\$0.51	\$0.80	\$0.38	\$0.38	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
1883	18.2	16.0	42.9	103.0	.45	.72	.28	.30	\$73.23	\$96.92	\$30.84	\$26.49	\$2.98	\$8.81
1884	30.0	14.5	37.5	95.0	.30	.46	.23	.32	79.52	98.33	33.37	26.69	2.71	6.80
1885	28.9	12.8	37.5	75.0	.28	.63	.23	.42	72.35	94.55	29.00	26.23	2.39	5.78
1886	23.9	11.5	25.0	65.0	.37	.52	.30	.58	77.86	100.40	30.94	23.61	2.24	4.98
1887	33.0	14.3	31.4	105.0	.35	.52	.25	.43	77.60	99.85	28.00	22.31	2.43	5.42
1888	25.5	9.7	27.2	80.0	.33	.91	.26	.35	76.21	97.89	21.67	21.73	2.60	5.94
1889	18.0	9.4	18.7	54.0	.33	.60	.27	.37	78.03	94.74	28.00	20.42	5.52	7.16
1890	13.6	9.6	21.0	45.0	.50	.70	.32	.68	69.69	89.70	19.32	15.79	2.64	5.01
1891 ²	18.0	17.8	33.5	105.0	.40	.70	.26	.20	65.25	86.50	18.25	15.91	3.16	5.02
1891 ³	22.5	15.2	32.3	91.0	.35	.72	.25	.28	74.42	95.43	26.60	22.13	2.63	6.10
Means	23.63	13.02	29.98	82.65	.38	.66	.28	.41						

¹ Included in the Territories.

² North Dakota.

³ South Dakota.

⁴ The Dakotas.

APPENDIX No. 94.

Table showing the average condition, in percentages, of corn, wheat, oats, and potatoes, computed from reports from all counties where grown, by the month, for the years 1882 to 1891.

NORTH AND SOUTH DAKOTA.

Year.	Corn.				Wheat.				Oats.				Potatoes.			
	July.	Aug.	Sept.	Oct.	June.	July.	Aug.	Sept.	June.	July.	Aug.	Sept.	July.	Aug.	Sept.	Oct.
1882	92	93	87	90	(¹)	98	99	108	(¹)	107	108	106	106	108	107	102
1883	78	87	84	71	100	103	97	103	102	105	101	107	106	108	107	102
1884	101	90	95	105	103	102	96	96	102	99	90	97	102	95	95	99
1885	102	95	98	99	101	101	100	96	103	103	100	99	100	92	91	78
1886	101	77	81	77	99	85	62	71	97	88	80	75	100	90	65	60
1887	95	97	96	96	94	87	88	89	92	82	87	89	98	98	93	90
1888	75	84	85	91	92	98	91	78	90	94	87	90	78	94	90	83
1889	83	95	67	64	88	62	57	63	92	60	54	60	77	80	82	83
1890	96	90	48	55	90	94	88	68	90	95	78	72	97	81	60	44
1891 ²	94	93	87	70	96	98	99	94	96	97	97	95	99	100	97	98
1891 ³	90	87	82	80		97	98	99		96	98	95	98	100	98	93
Means	92	90	82	82	96	93	88	87	96	93	89	89	95	94	89	82

¹ Included in the Territories.

² North Dakota.

³ South Dakota.

⁴ The Dakotas.

APPENDIX No. 95.

Mean percentage of clear weather (sunshine), expressed as the complement of the percentage of cloudiness. Computed from records at all stations.

[Annual Report Meteorological Service, Dominion of Canada.]

MANITOBA.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1872	51	49	53	41	35	57	47	69	39	53	29	53	49
1873	42	38	55	59	44	61	56	65	39	45	38	55	50
1874	43	49	64	66	58	54	66	56	67	71	47	48	58
1875	76	64	55	43	55	53	61	60	53	39	47	46	55
1876	58	63	53	60	51	56	62	52	56	45	37	56	51
1877	62	69	64	62	39	36	65	66	60	50	44	41	55
1878	55	34	47	43	47	59	59	65	44	33	58	25	47
1879	52	50	55	49	43	42	55	53	62	38	36	55	49
1880	51	54	58	55	38	54	57	49	42	33	46	50	49
1881	70	36	61	52	49	42	60	59	37	42	33	61	60
1882	46	50	47	55	53	52	51	69	63	39	40	45	51
1883	57	69	60	51	50	53	54	50	59	35	41	69	53
1884	66	59	68	53	65	53	52	57	46	42	44	50	55
1885	68	63	47	43	47	48	54	56	59	44	33	54	51
1886	58	56	57	56	52	57	62	60	53	52	61	61	57
1887	61	61	55	49	53	53	59	56	62	49	53	46	55
Means	57	54	56	52	49	52	58	59	53	44	43	51	52

APPENDIX No. 96.

Mean percentage of clear weather (sunshine), expressed as the complement of the percentage of cloudiness. Computed from records at all stations.

[Annual Report Meteorological Service, Dominion of Canada.]

BRITISH COLUMBIA.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1872	17	46	59	55	55	54	63	57	34	41	35	29	48
1873	38	43	34	30	46	44	45	45	63	66	37	35	44
1874	27	38	41	52	45	47	67	46	40	45	34	29	43
1875	56	56	35	67	51	49	74	71	73	47	32	36	54
1876	44	36	37	49	51	50	61	57	58	46	40	31	47
1877	37	53	41	44	50	51	55	68	43	50	36	40	48
1878	32	23	38	52	51	65	61	75	54	50	27	45	48
1879	44	32	32	49	50	53							
1880	21	52	36	55	26	52	46	53	35	44	52	29	42
1881	45	33	26	50	39	44	45	52	53	35	26	27	40
1882	33	24					68	58	66	43	46	37	
1887	18	49	19	26	34	38	58	64	43	40	35	24	37
Means	37	40	36	48	45	50	58	59	51	46	36	33	45

APPENDIX No. 97.

Mean percentage of cloudiness, computed from records at all stations.

[Annual Report Meteorological Service, Dominion of Canada.]

MANITOBA.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1872	46	51	47	59	65	43	43	31	61	47			
1873	58	62	45	41	56	39	44	35	61	55	71	47	51
1874	57	51	36	34	42	46	34	44	33	29	53	52	42
1875	24	36	45	57	45	47	36	40	47	61	53	54	45
1876	42	37	47	40	49	44	38	48	44	55	63	44	46
1877	38	31	36	38	61	64	35	34	40	50	56	59	45
1878	45	65	53	57	53	41	41	35	56	67	42	75	53
1879	48	50	45	51	57	58	45	47	38	62	64	45	51
1880	49	46	42	45	62	46	43	51	58	67	54	50	51
1881	30	64	39	48	51	58	40	41	63	58	67	39	40
1882	54	50	53	45	47	48	49	31	37	61	60	55	49
1883	43	31	40	49	50	47	46	50	41	65	69	31	47
1884	34	41	32	47	35	47	48	43	54	58	56	50	45
1885	32	37	53	57	53	52	46	44	41	56	67	46	49
1886	42	44	43	44	48	43	38	40	47	48	39	39	43
1887	39	39	45	51	47	47	41	44	38	51	47	54	45
Means	43	46	44	48	51	48	42	41	47	56	57	49	47

APPENDIX No. 98.

Mean percentage of cloudiness, computed from records at all stations.

[Annual Report Meteorological Service, Dominion of Canada.]

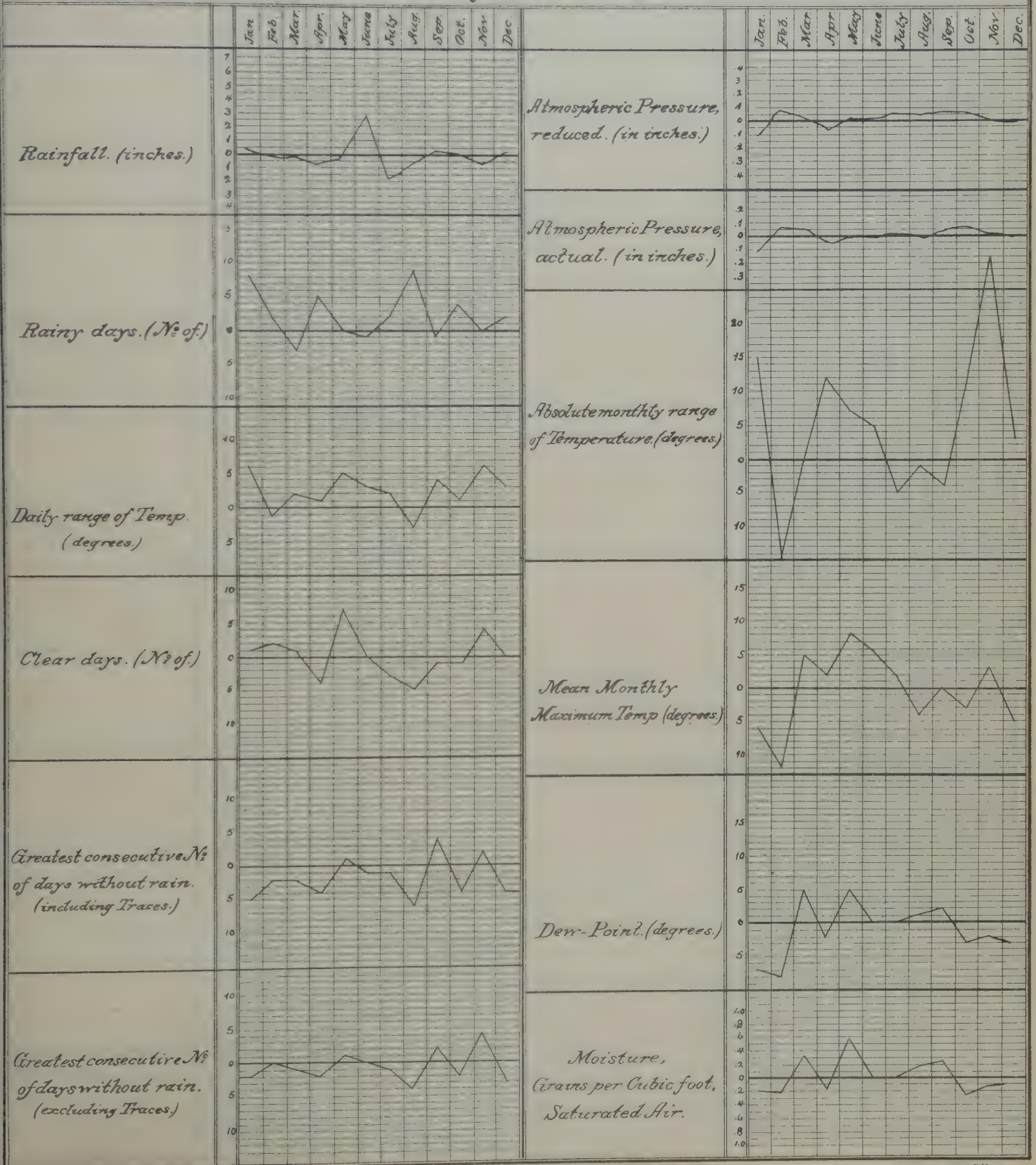
BRITISH COLUMBIA.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1872	53	54	41	45	45	46	37						
1873	62	57	66	70	54	56	55	43	66	59	65	71	52
1874	73	62	59	48	55	53	33	54	37	34	63	65	56
1875	44	44	65	33	49	51	26	26	60	55	66	71	57
1876	56	64	63	51	49	50	39	43	42	54	60	69	46
1877	63	47	56	56	50	49	45	32	57	50	64	60	53
1878	68	77	62	48	49	35	39	25	46	50	73	55	52
1879	56	68	68	51	50	47							
1880	79	48	64	45	74	48	54	47	65	56	48	71	58
1881	55	67	74	50	61	56	55	48	47	65	74	73	60
1882	67	76					32	42	34	57	54	63	
1887	82	51	81	74	66	62	42	36	57	60	65	76	63
Means	63	60	64	52	55	50	42	41	49	54	64	67	55

Bismarck, N. Dakota.

1887.

Comparative Curves of Monthly Deviations from Normal Values.

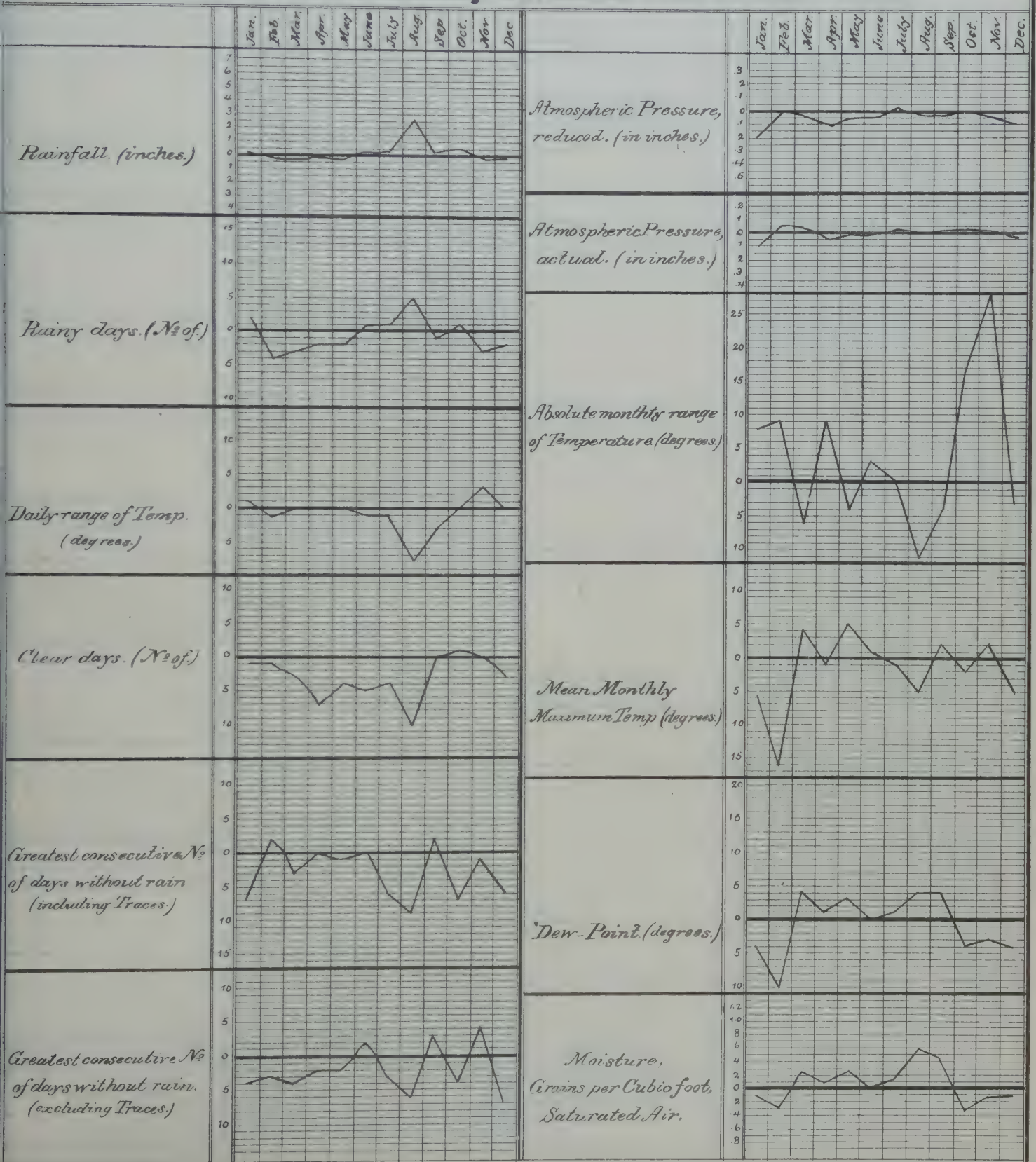




Fort Buford, N. Dakota.

1887.

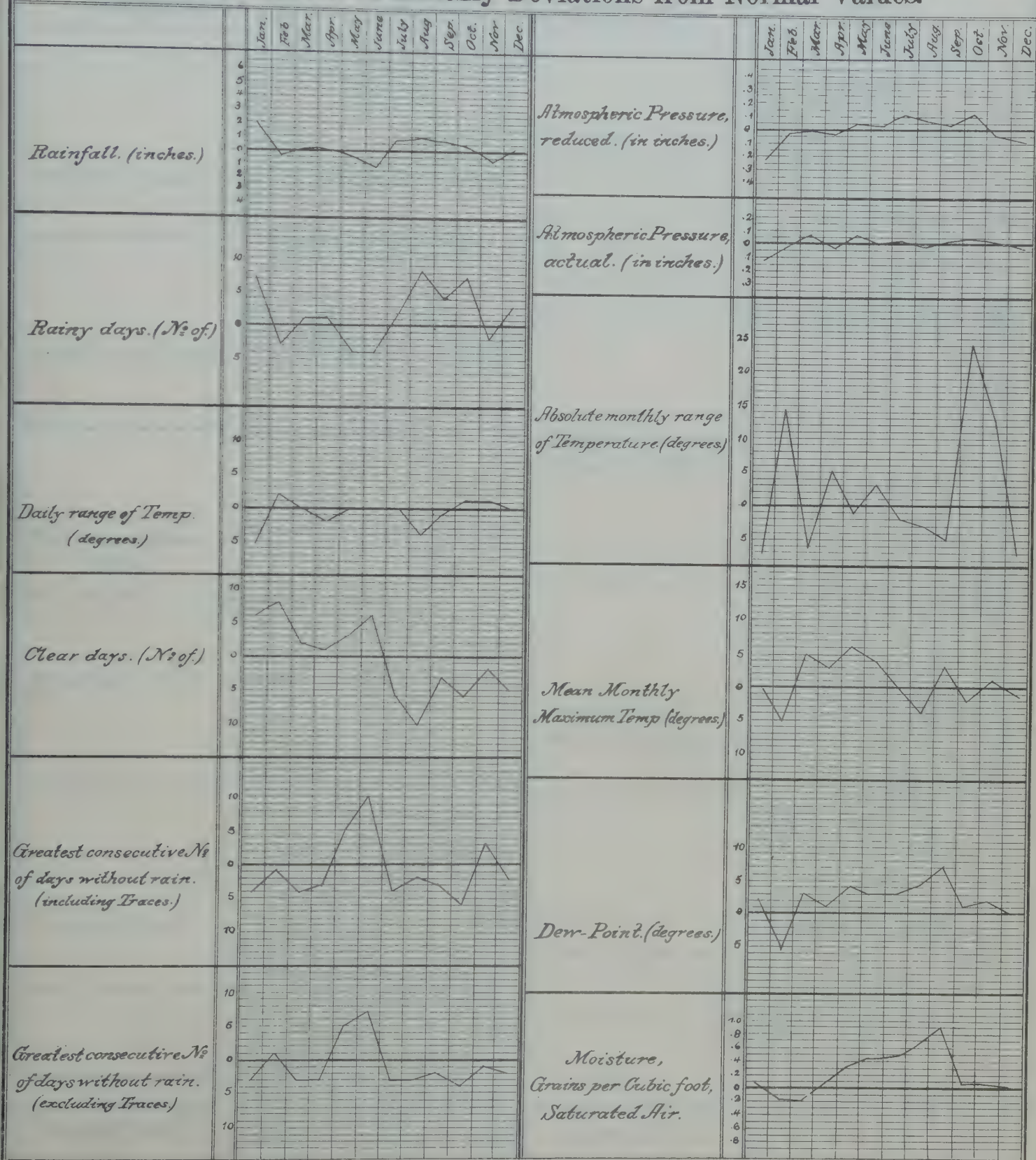
Comparative Curves of Monthly Deviations from Normal Values.



Deadwood, S. Dakota.

1887.

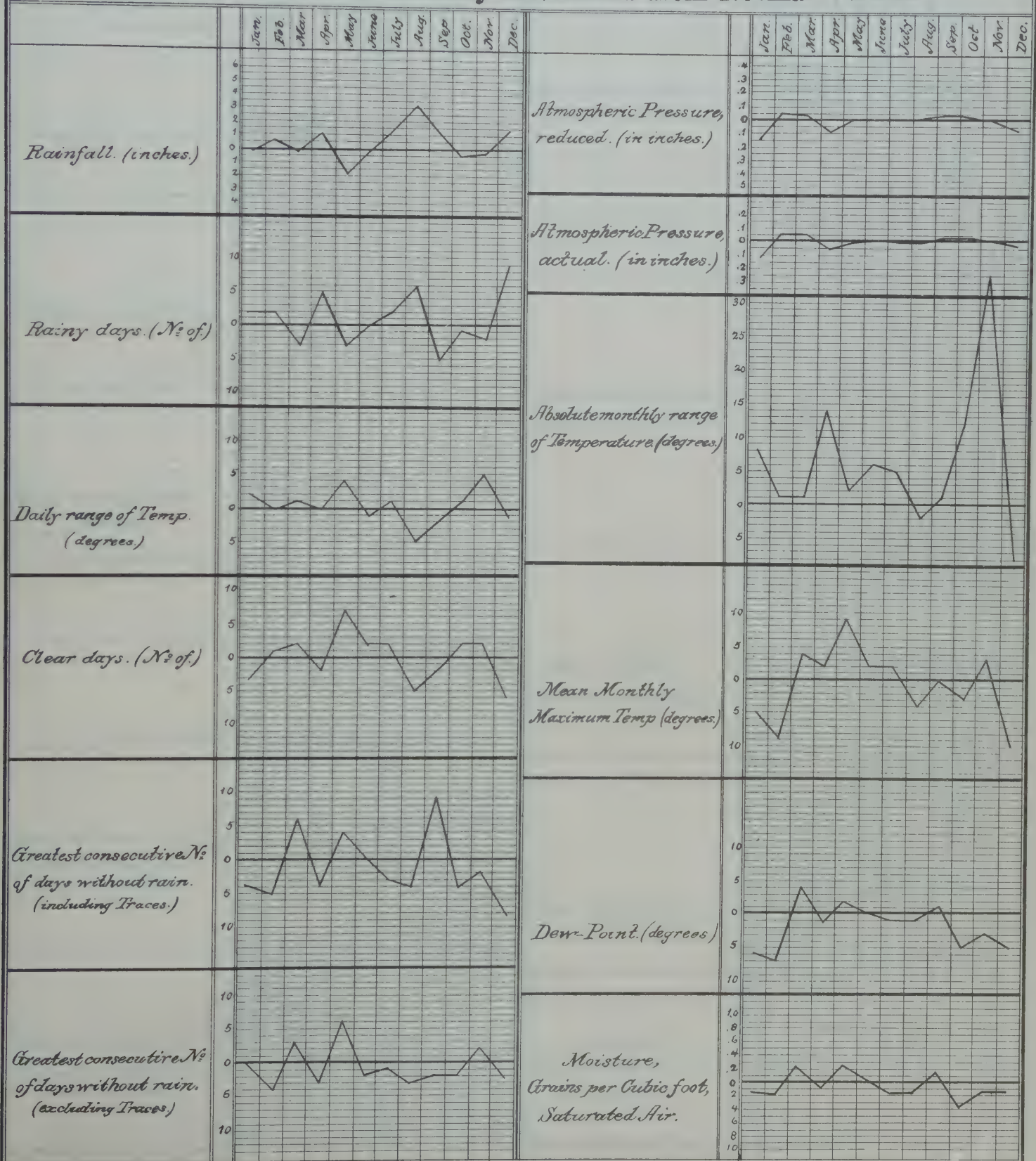
Comparative Curves of Monthly Deviations from Normal Values.



Huron, S. Dakota.

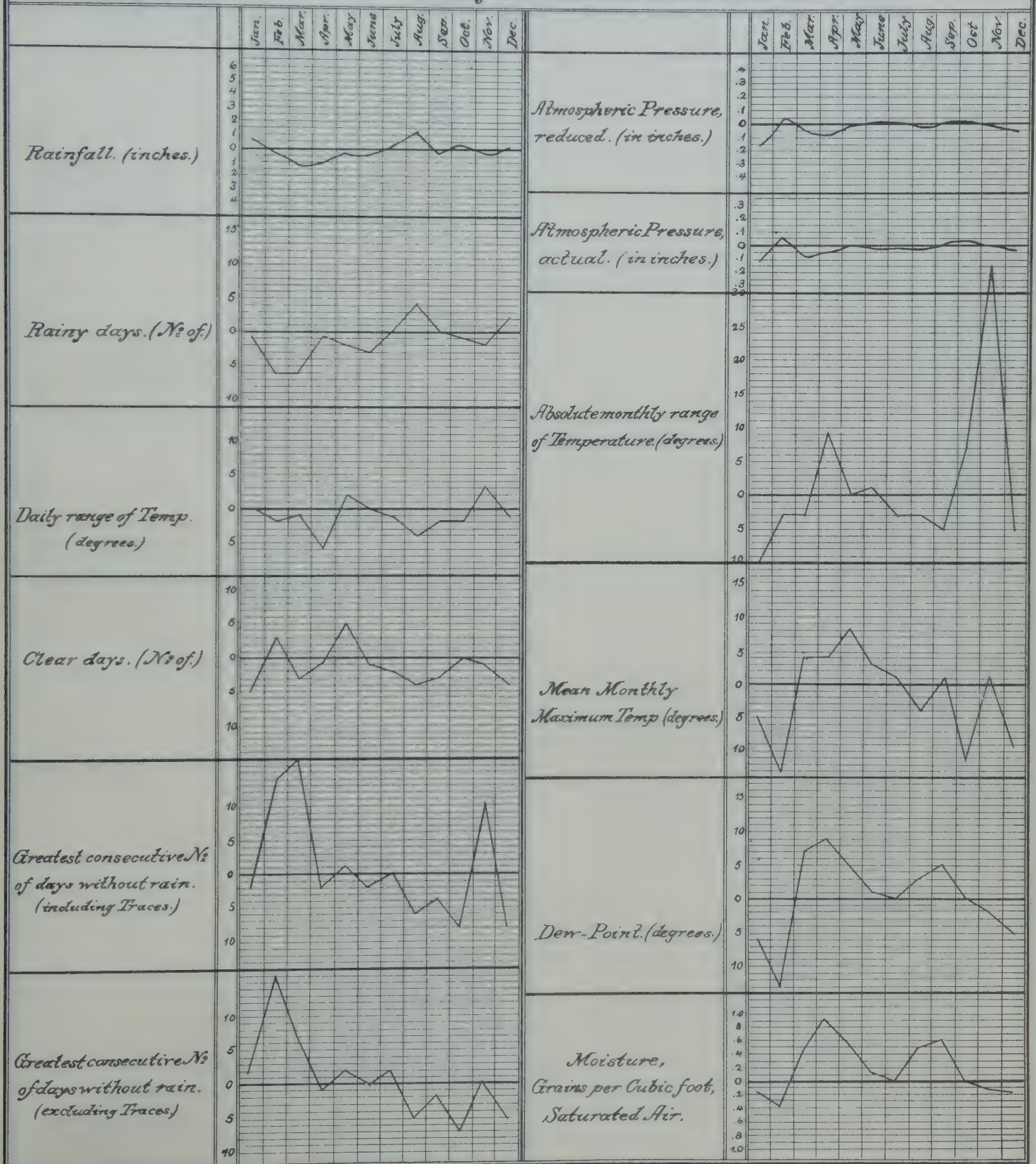
1887.

Comparative Curves of Monthly Deviations from Normal Values.



Fort Sully, S. Dakota. 1887.

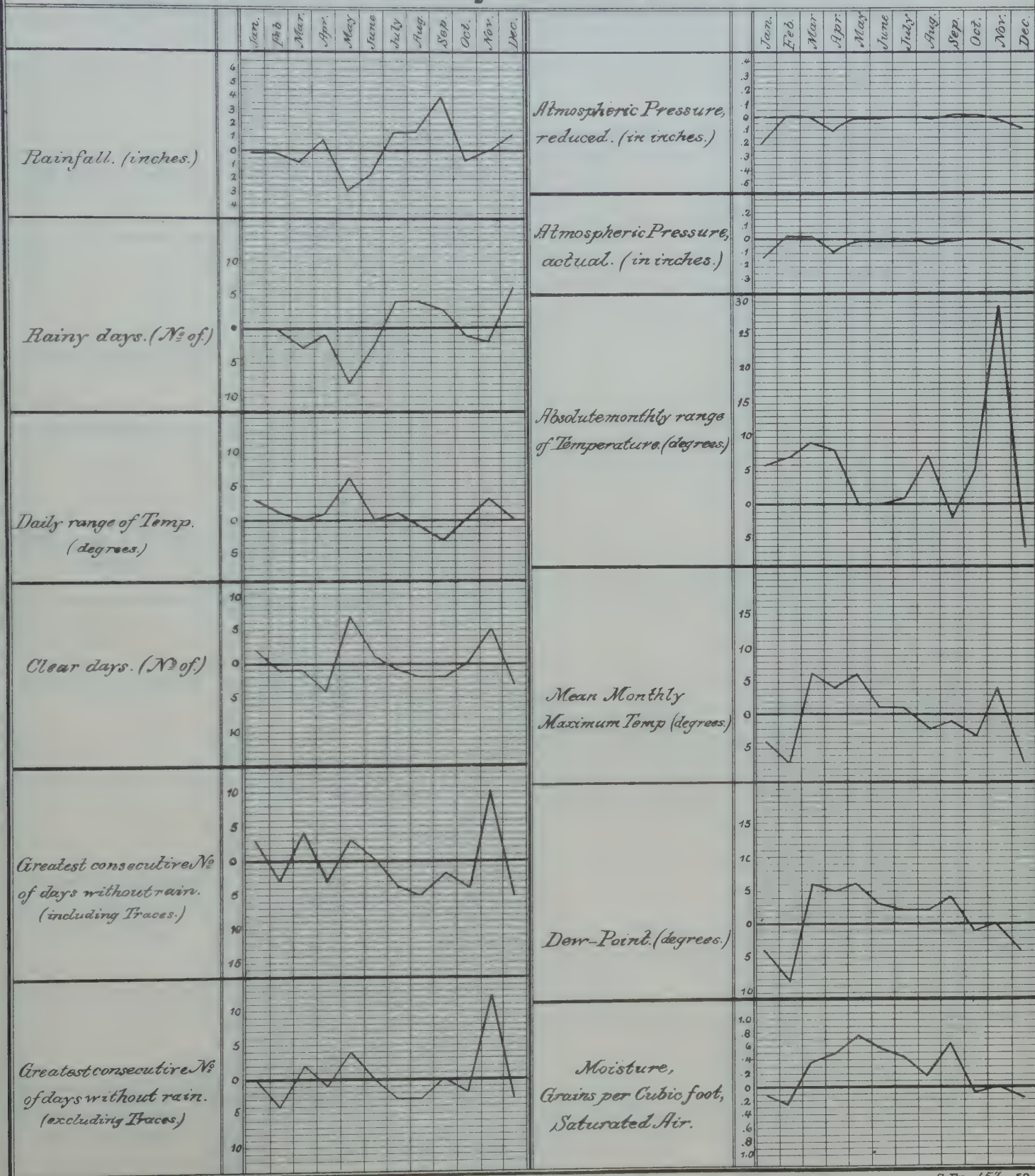
Comparative Curves of Monthly Deviations from Normal Values.



Yankton, S. Dakota.

1887.

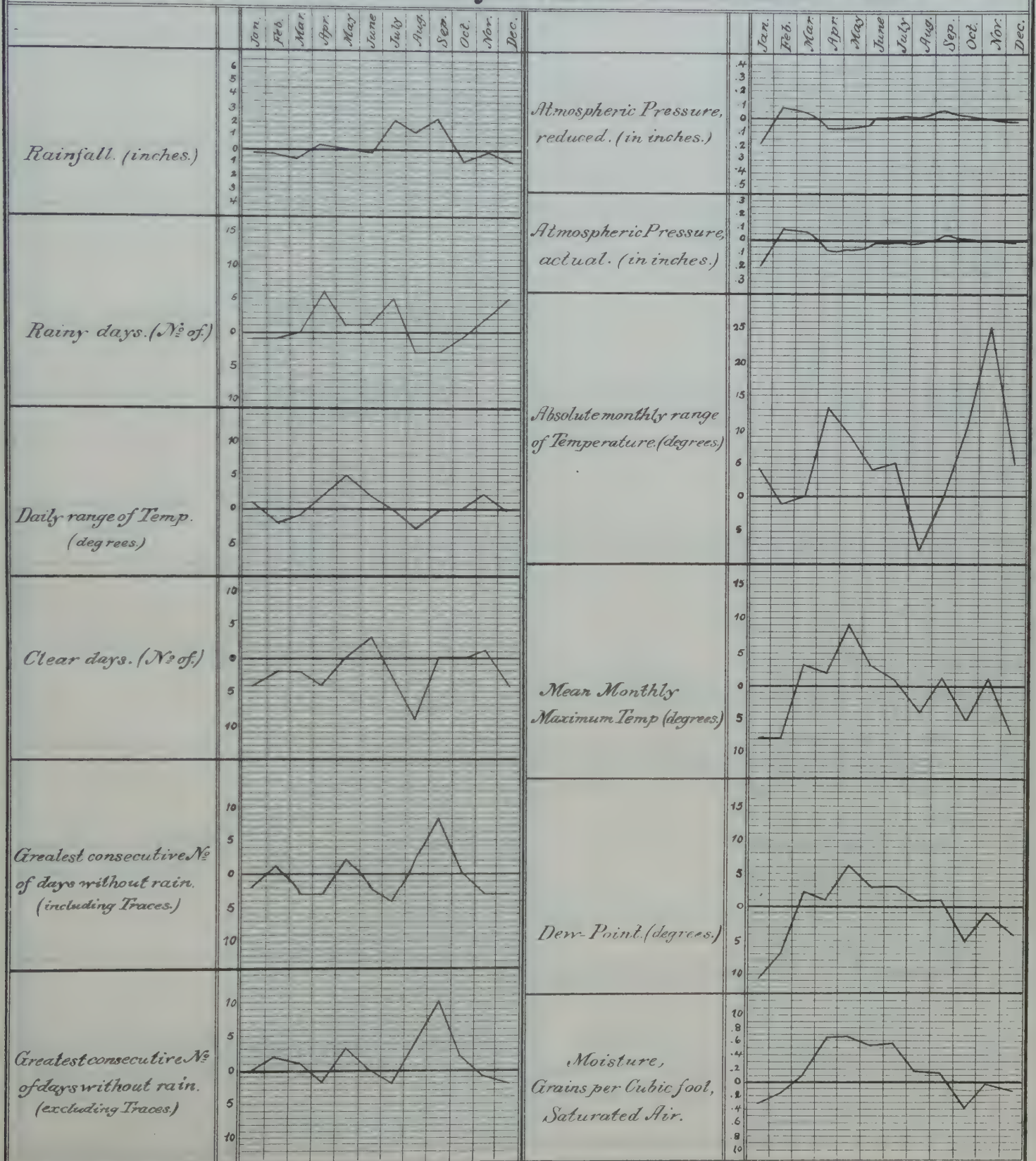
Comparative Curves of Monthly Deviations from Normal Values.



Moorhead, Minn.

1887.

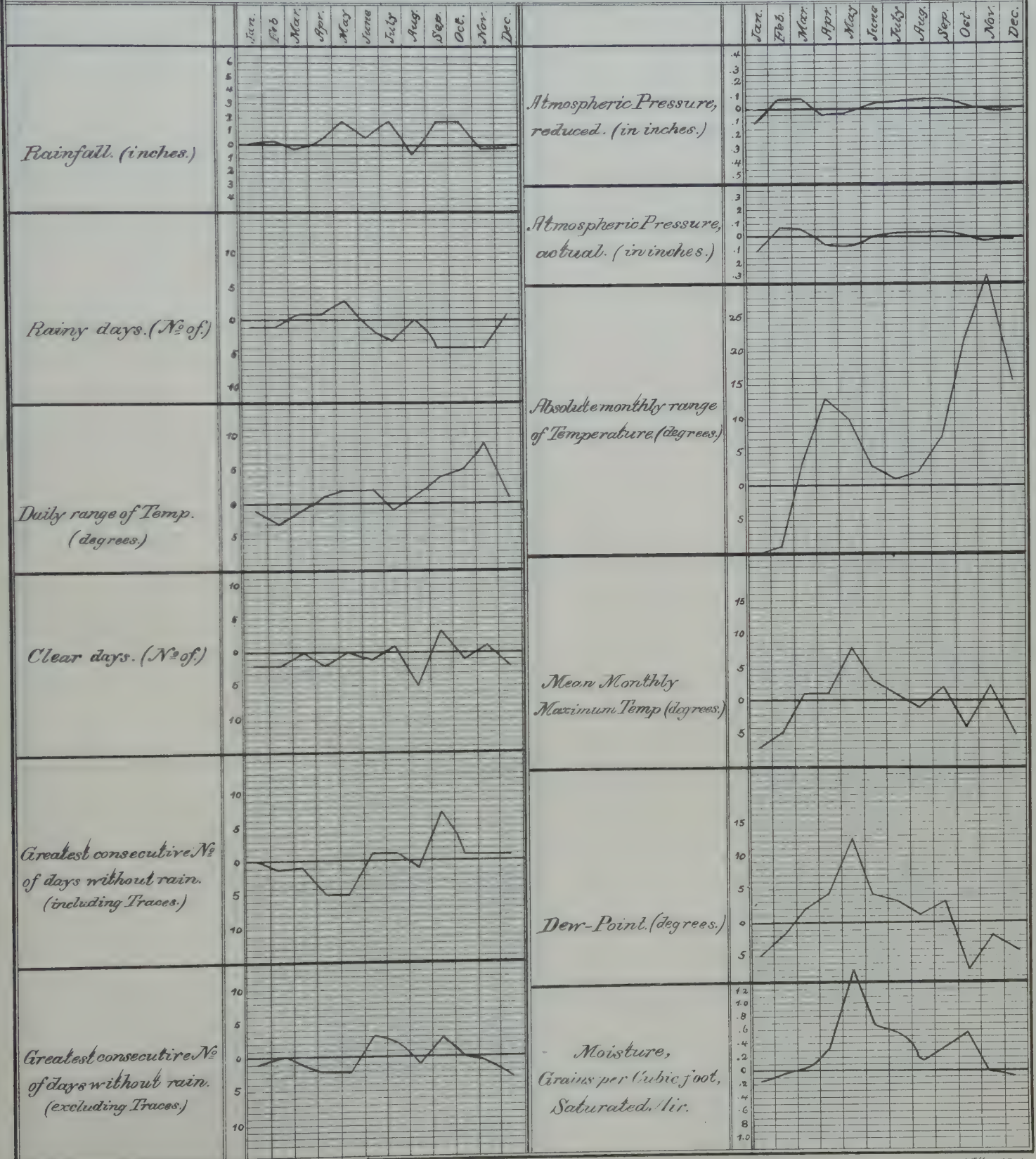
Comparative Curves of Monthly Deviations from Normal Values.



Saint Vincent, Minn.

1887.

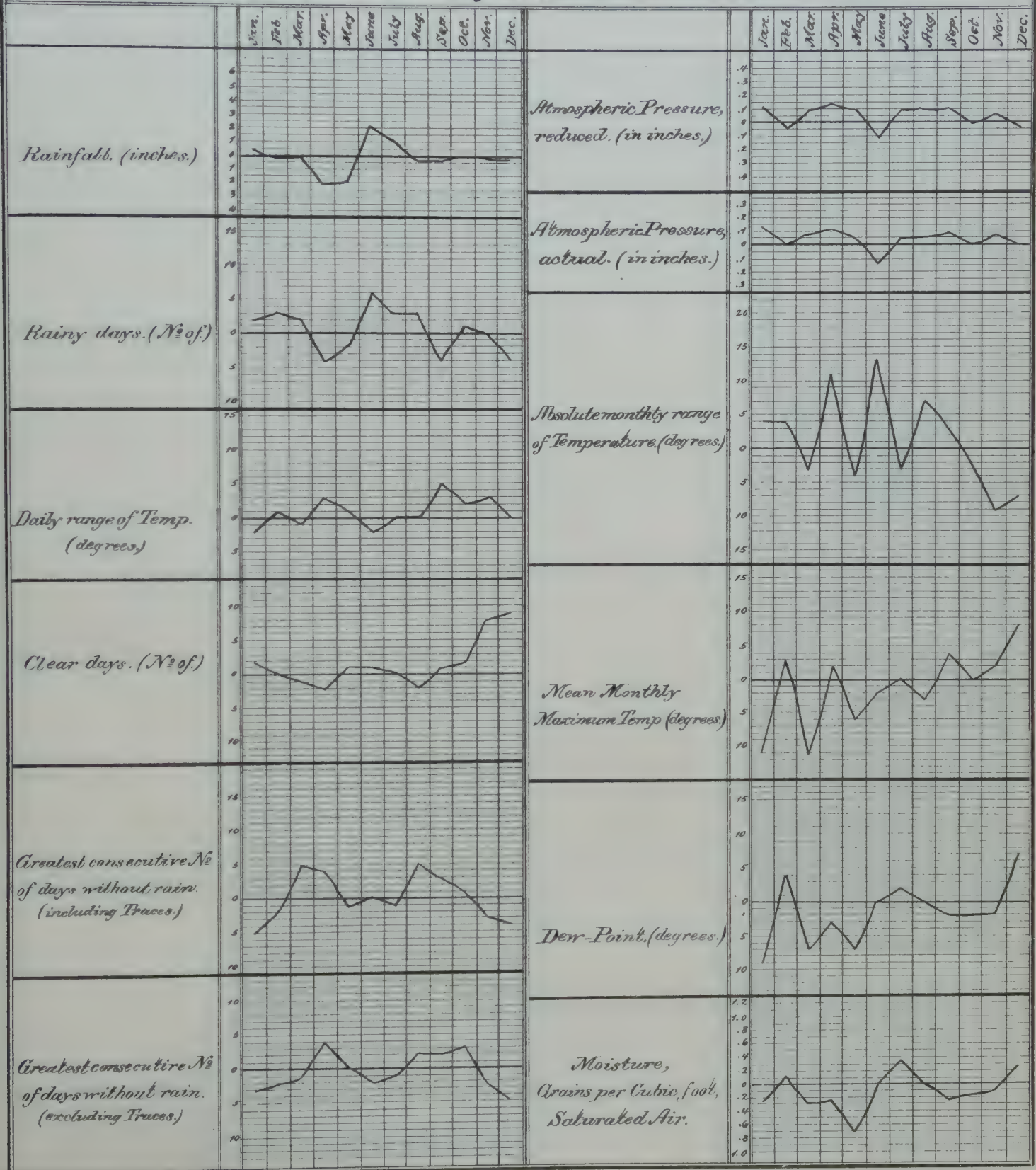
Comparative Curves of Monthly Deviations from Normal Values.



Bismarck, N. Dakota.

1888.

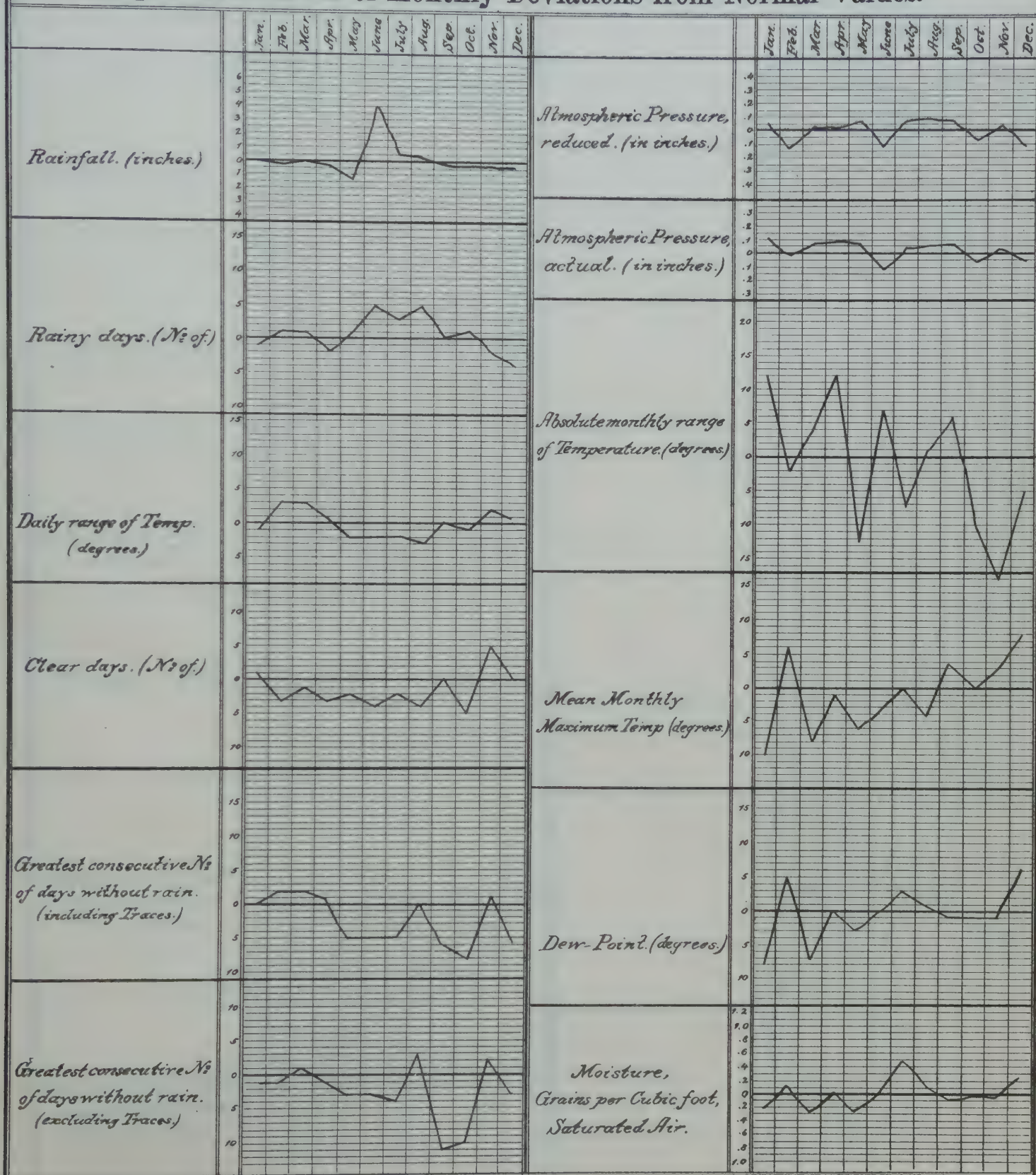
Comparative Curves of Monthly Deviations from Normal Values.



Fort Buford, N. Dakota.

1888.

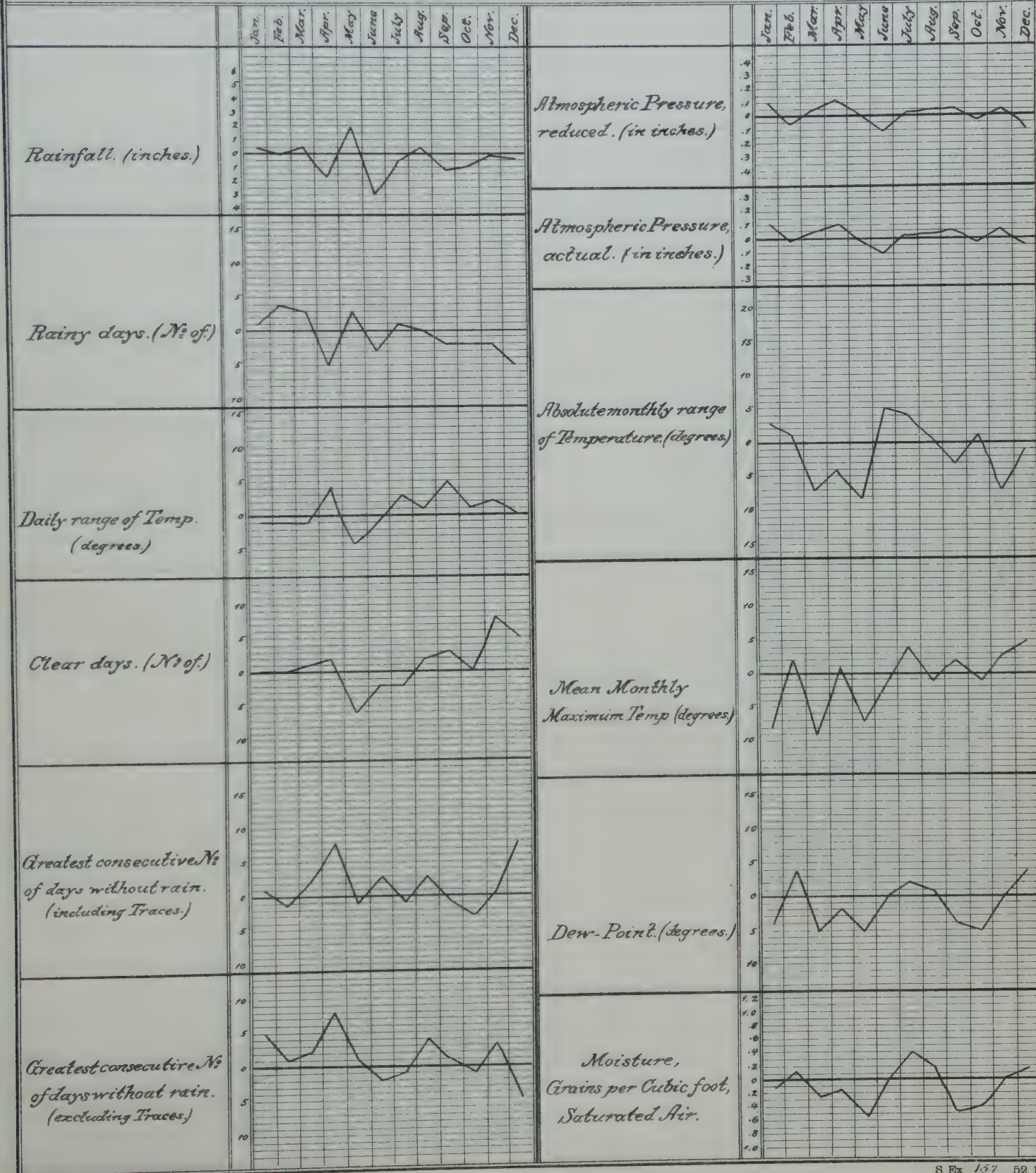
Comparative Curves of Monthly Deviations from Normal Values.



Huron, S. Dakota.

1888.

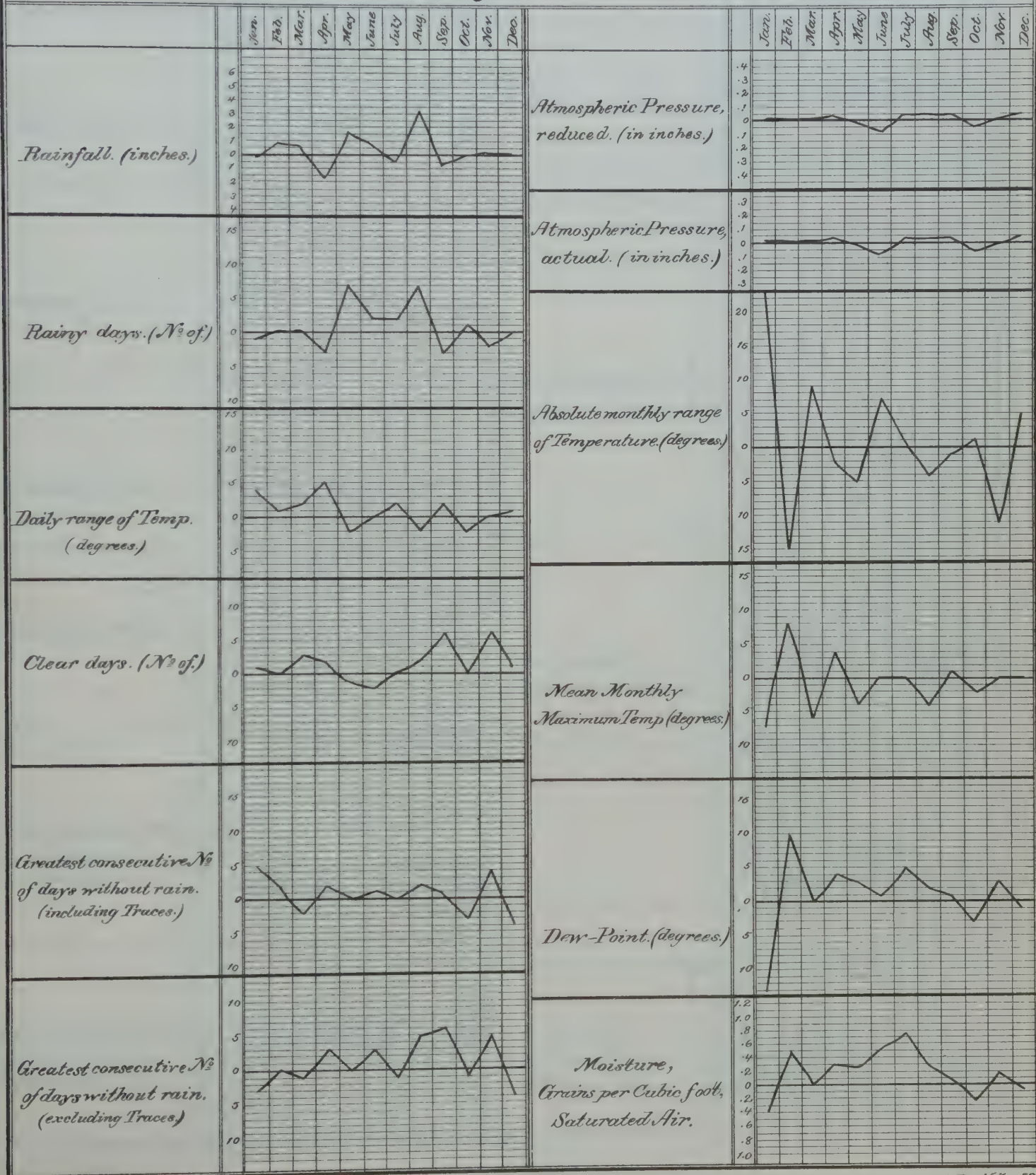
Comparative Curves of Monthly Deviations from Normal Values.



Rapid City, S. Dakota.

1888.

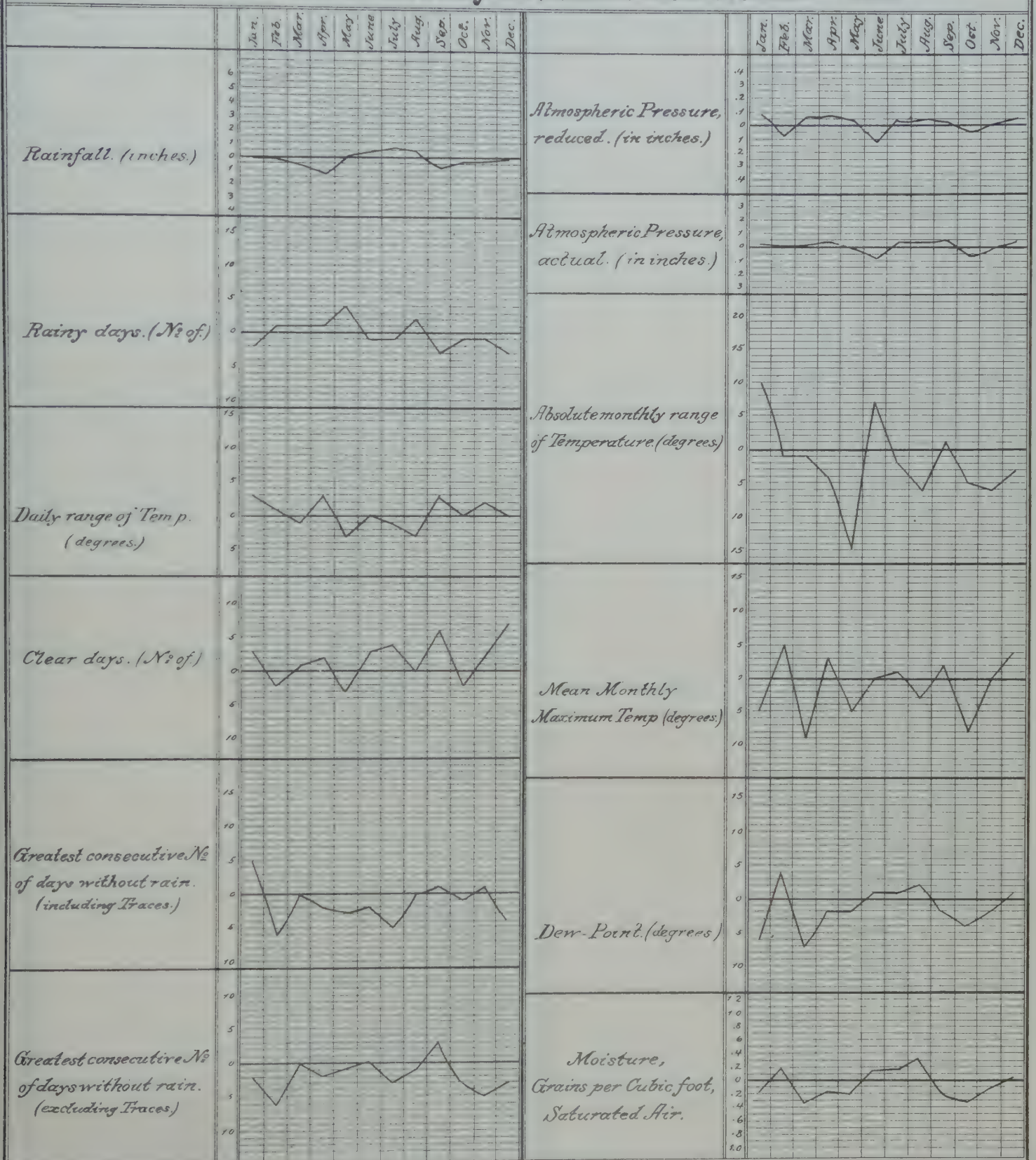
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Fort Sully, S. Dakota.

1888.

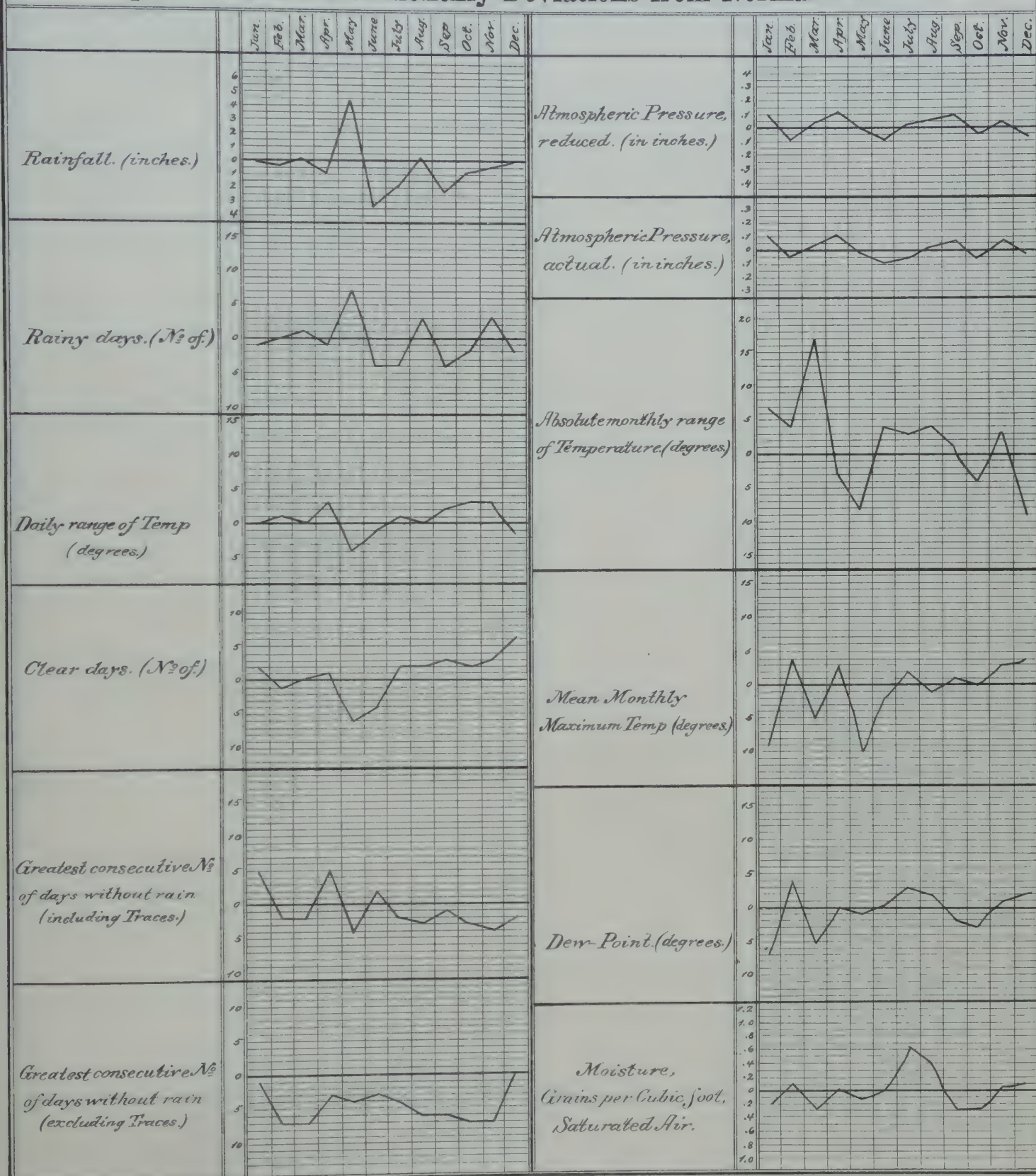
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Yankton, S. Dakota.

1888.

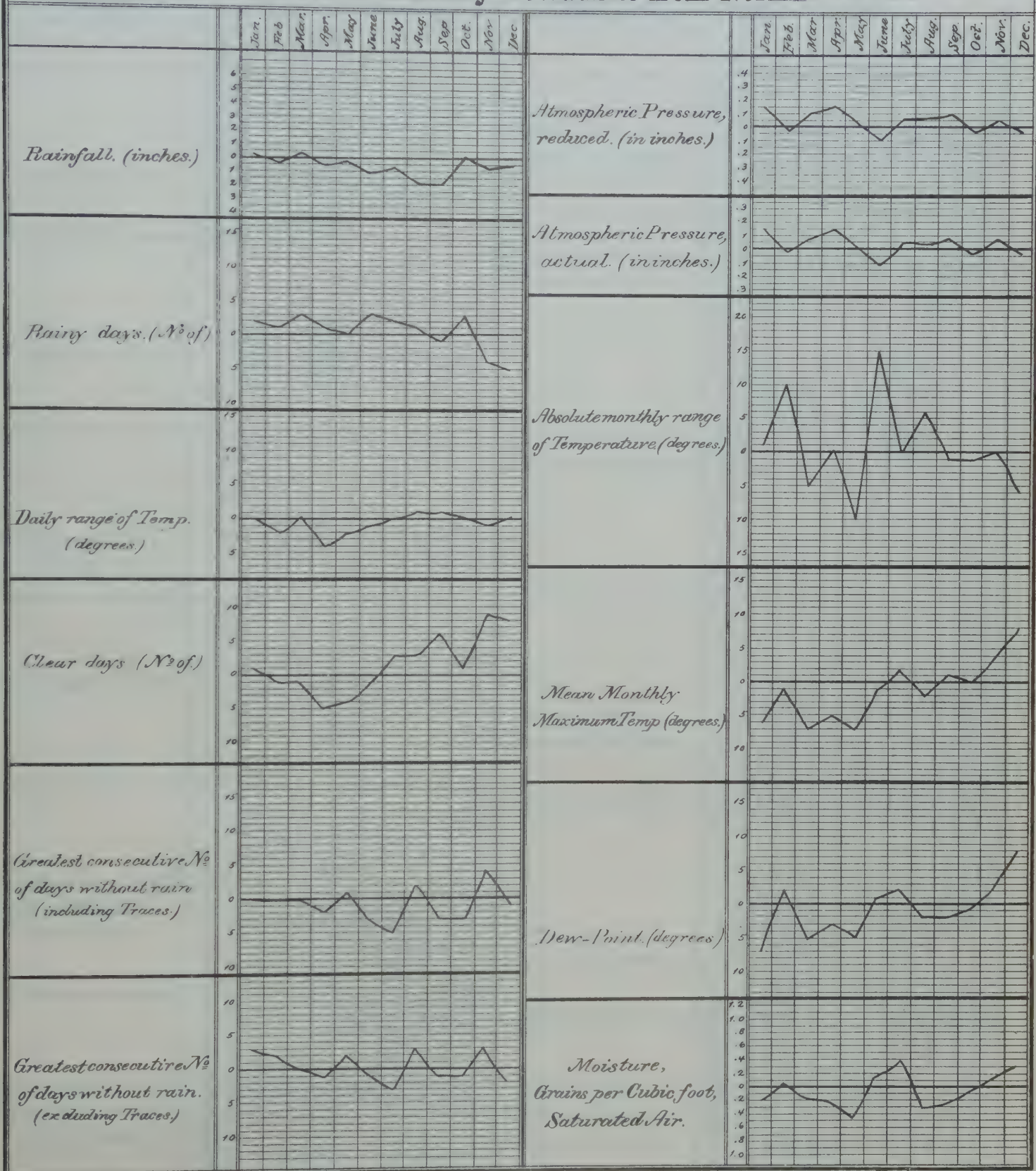
Comparative Curves of Monthly Deviations from Normal Values.



Moorhead, Minn.

1888.

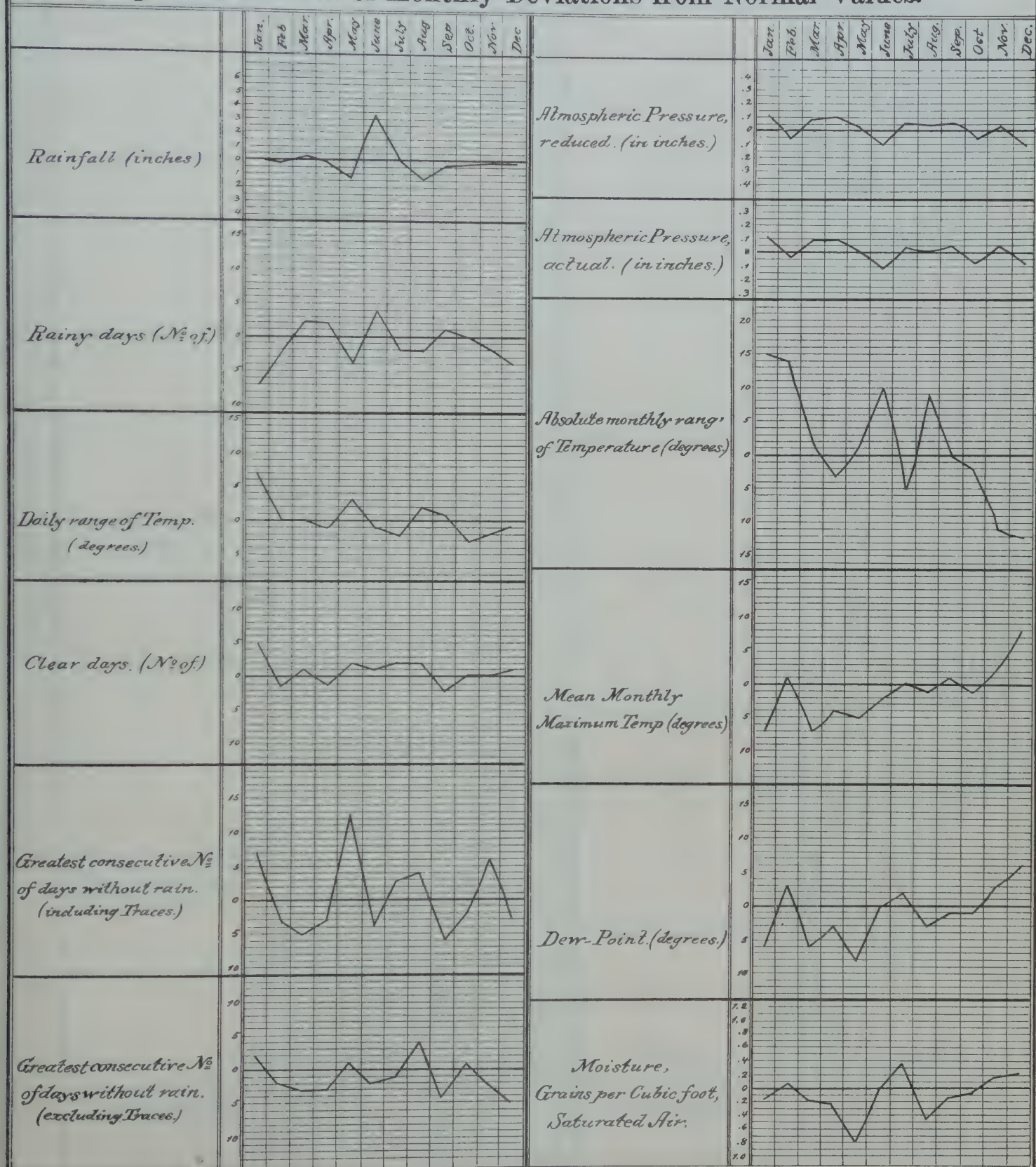
Comparative Curves of Monthly Deviations from Normal Values.



Saint Vincent, Minn.

1888.

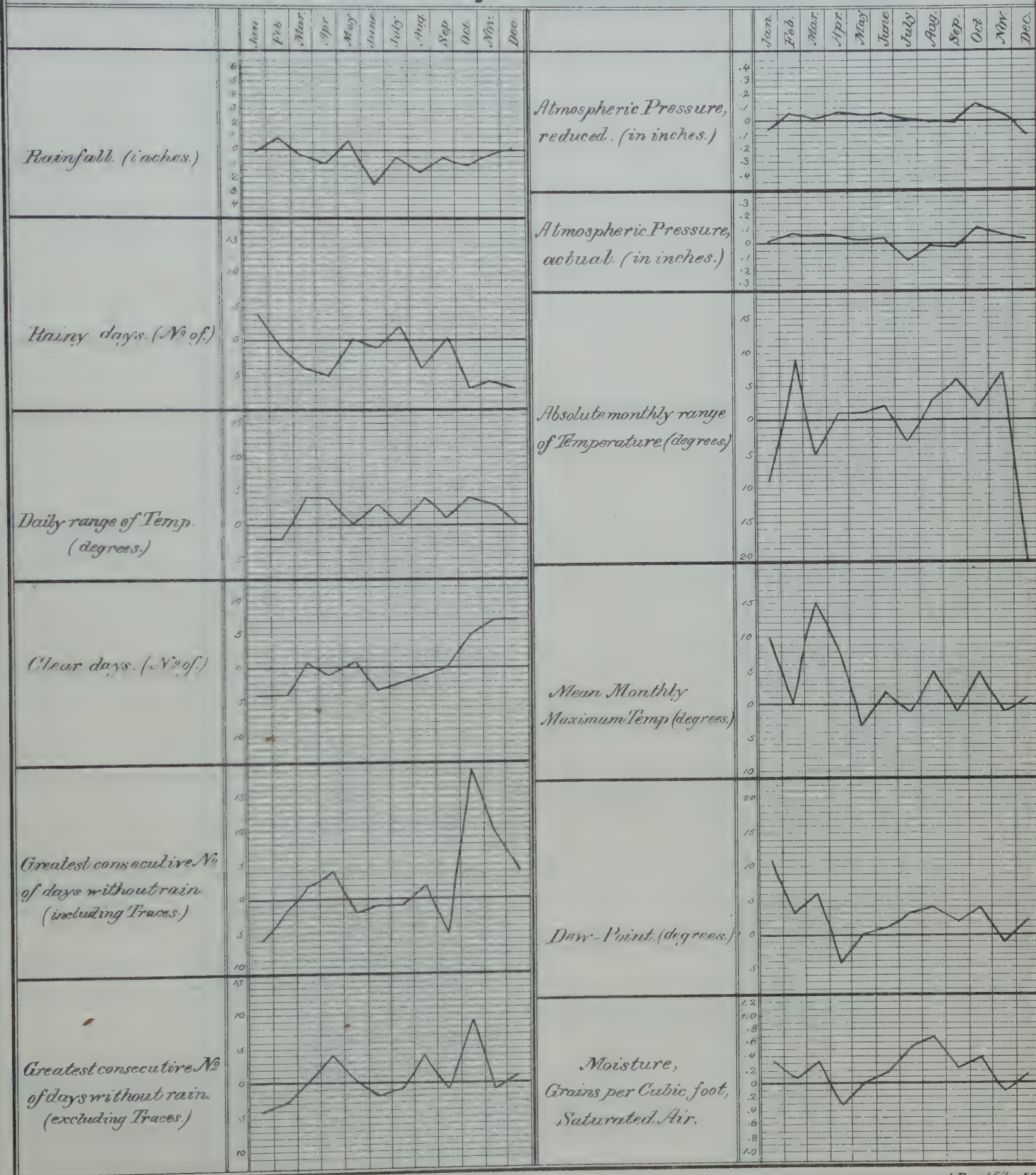
Comparative Curves of Monthly Deviations from Normal Values.



Bismarck, N. Dakota.

1889.

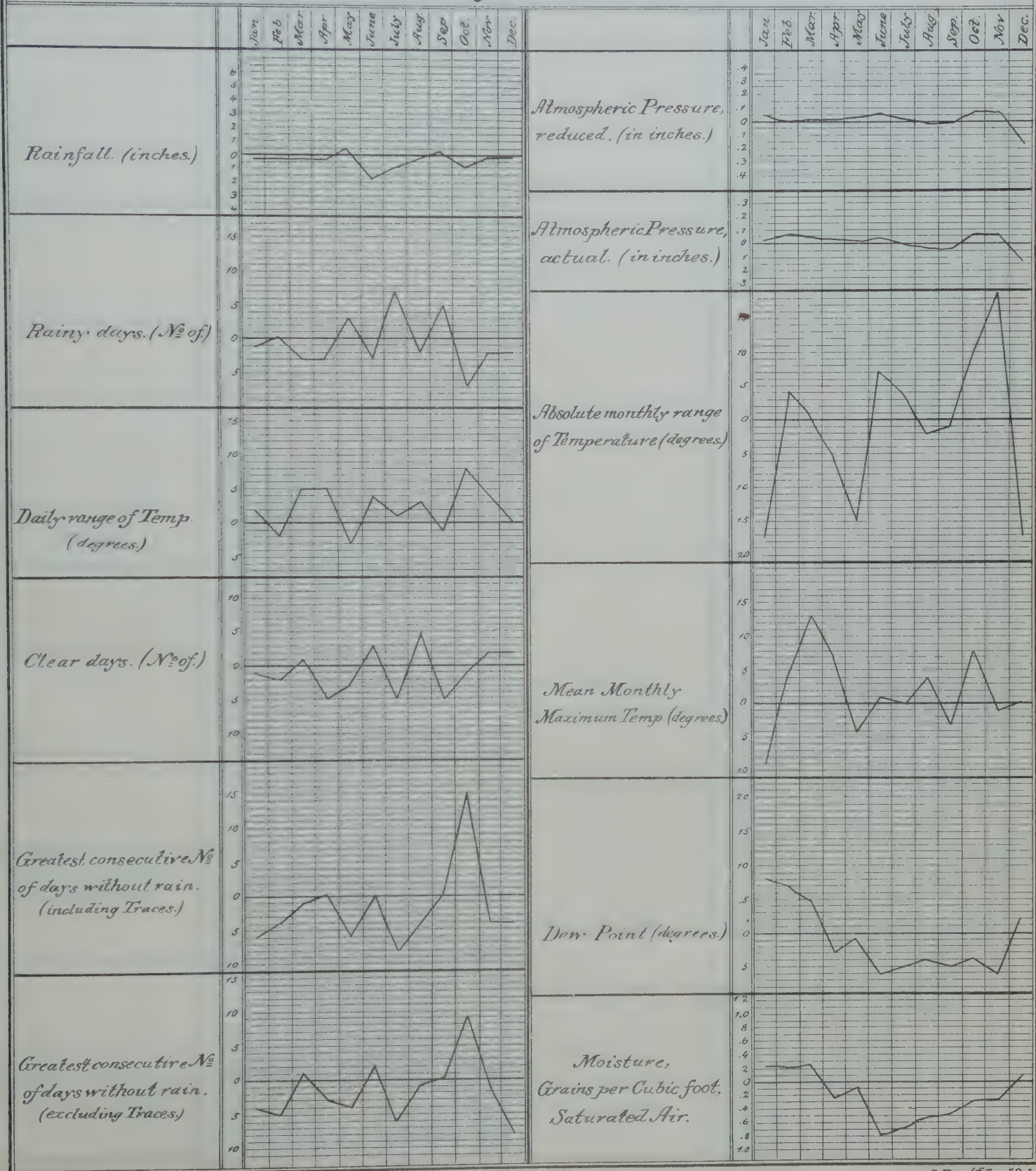
Comparative Curves of Monthly Deviations from Normal Values.



Fort Buford, N. Dakota.

1889.

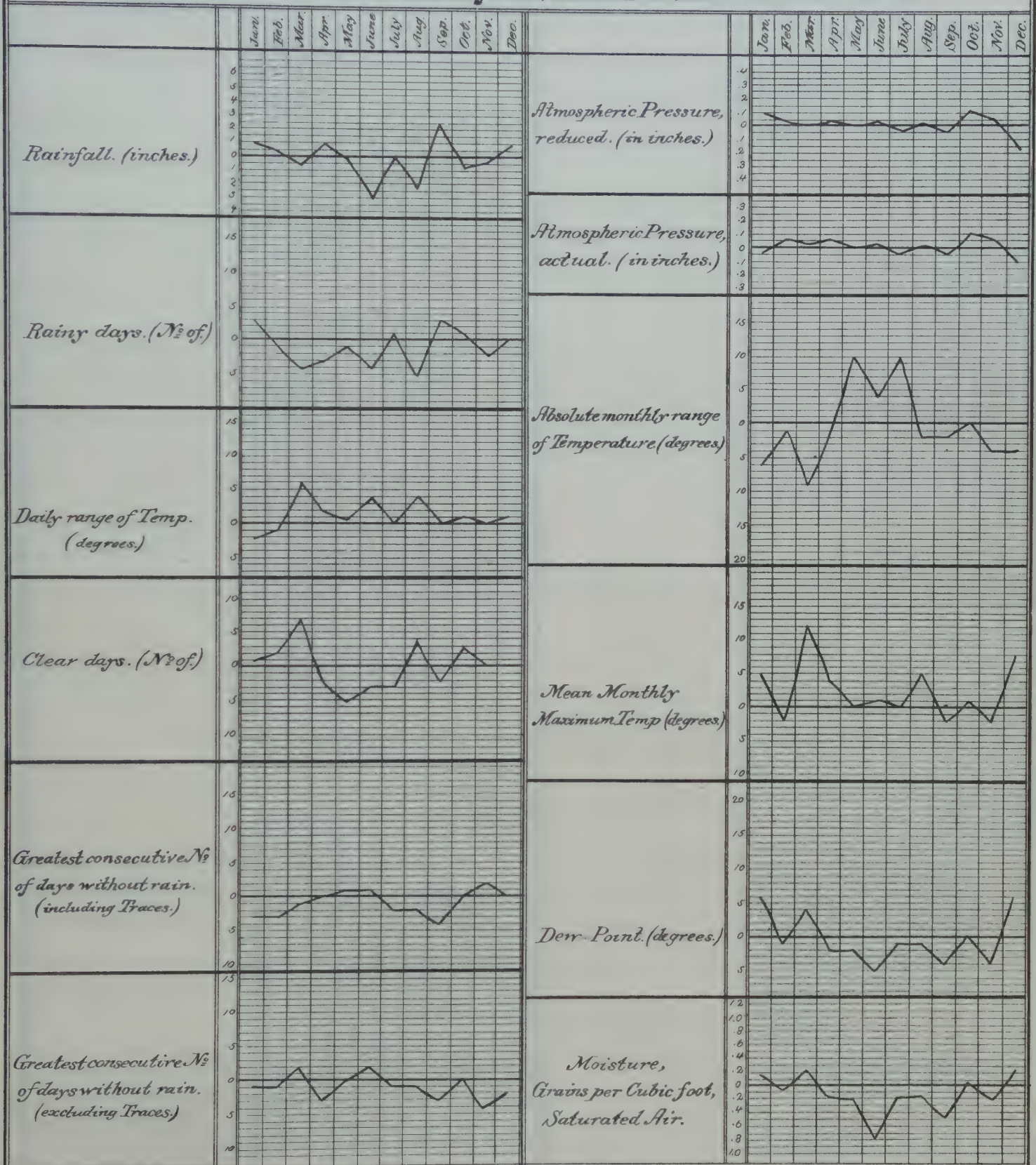
Comparative Curves of Monthly Deviations from Normal Values.



Huron, S. Dakota.

1889.

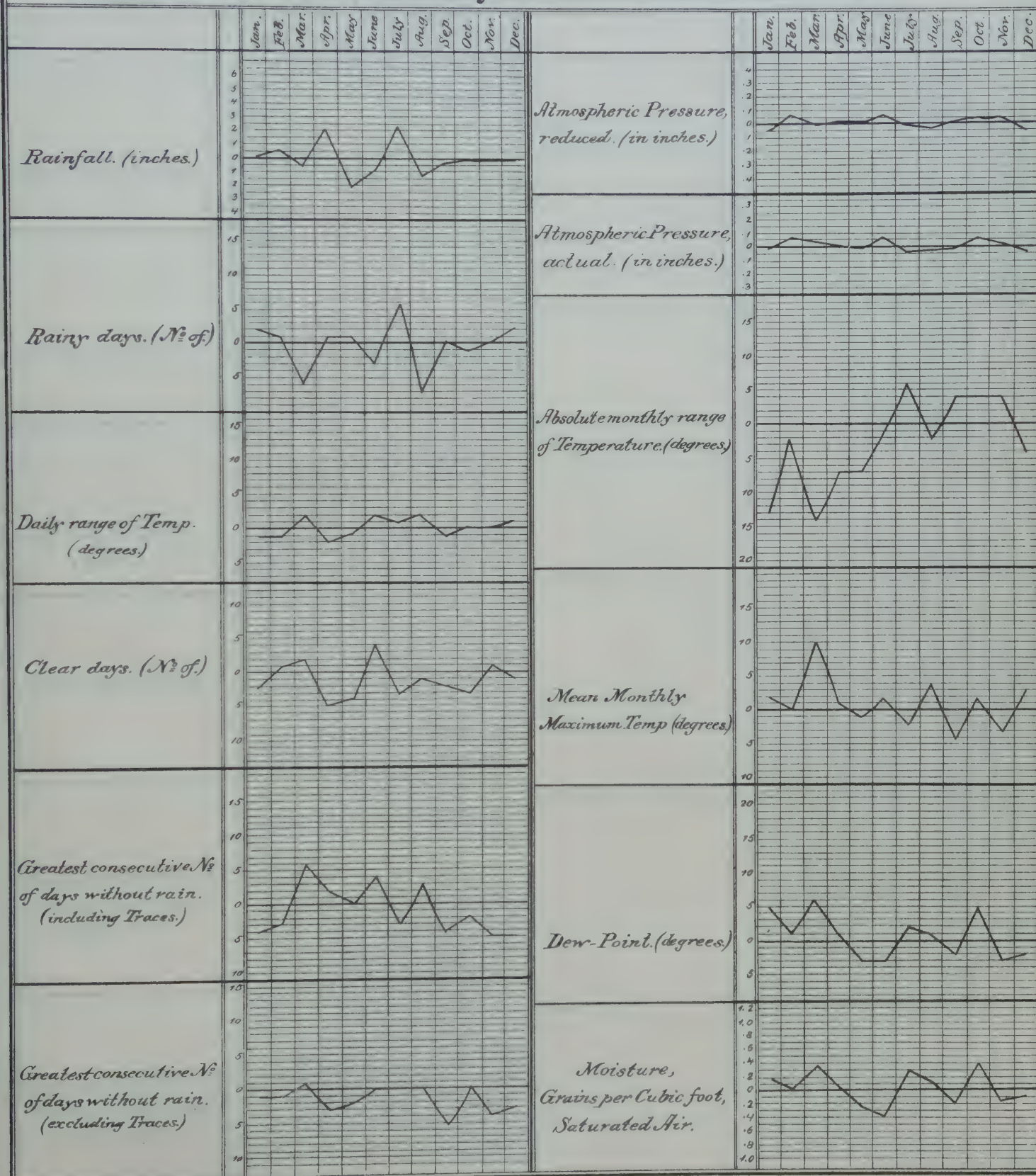
Comparative Curves of Monthly Deviations from Normal Values.



Rapid City, S. Dakota.

1889.

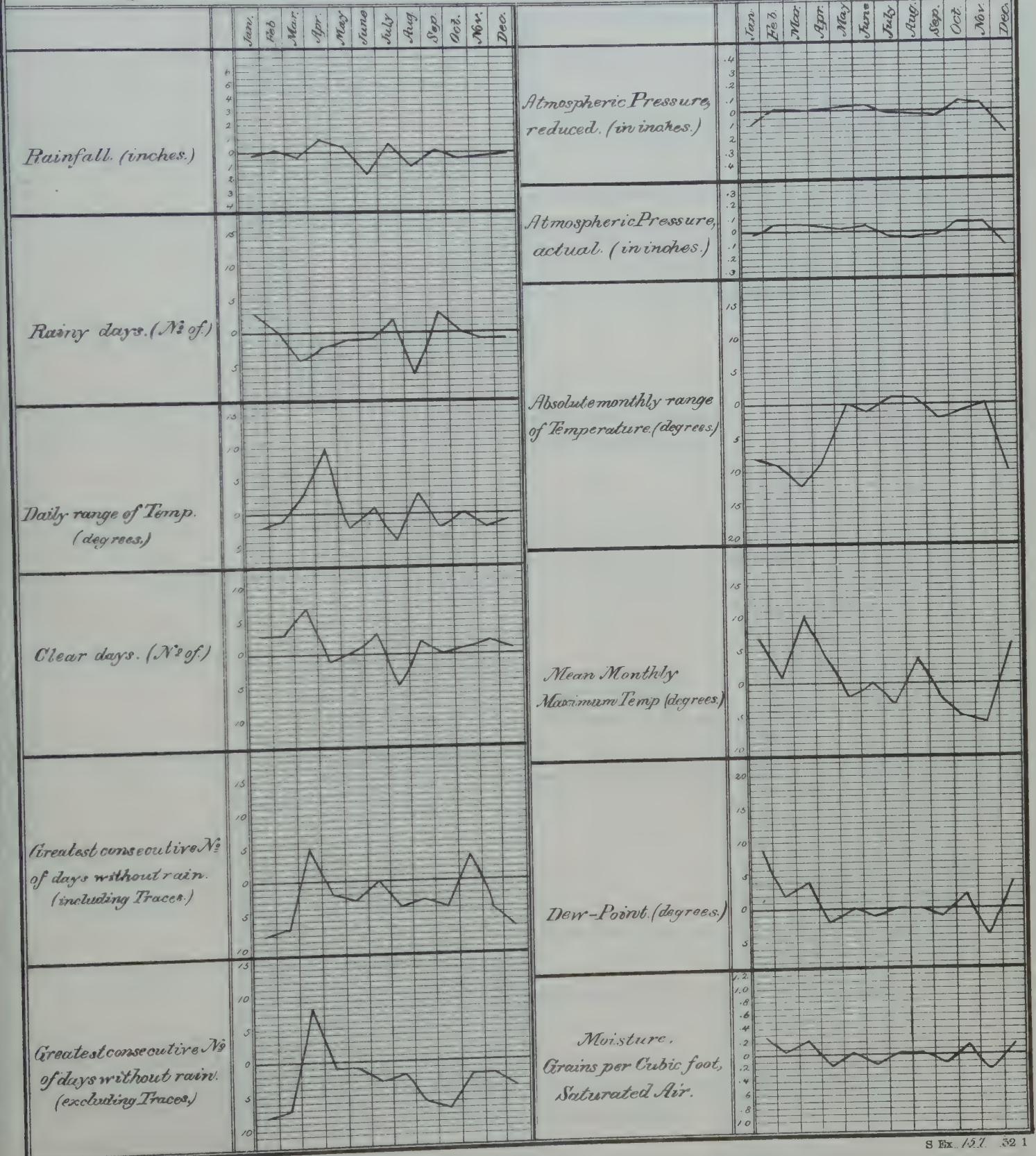
Comparative Curves of Monthly Deviations from Normal Values.



Fort Sully, S. Dakota.

1889.

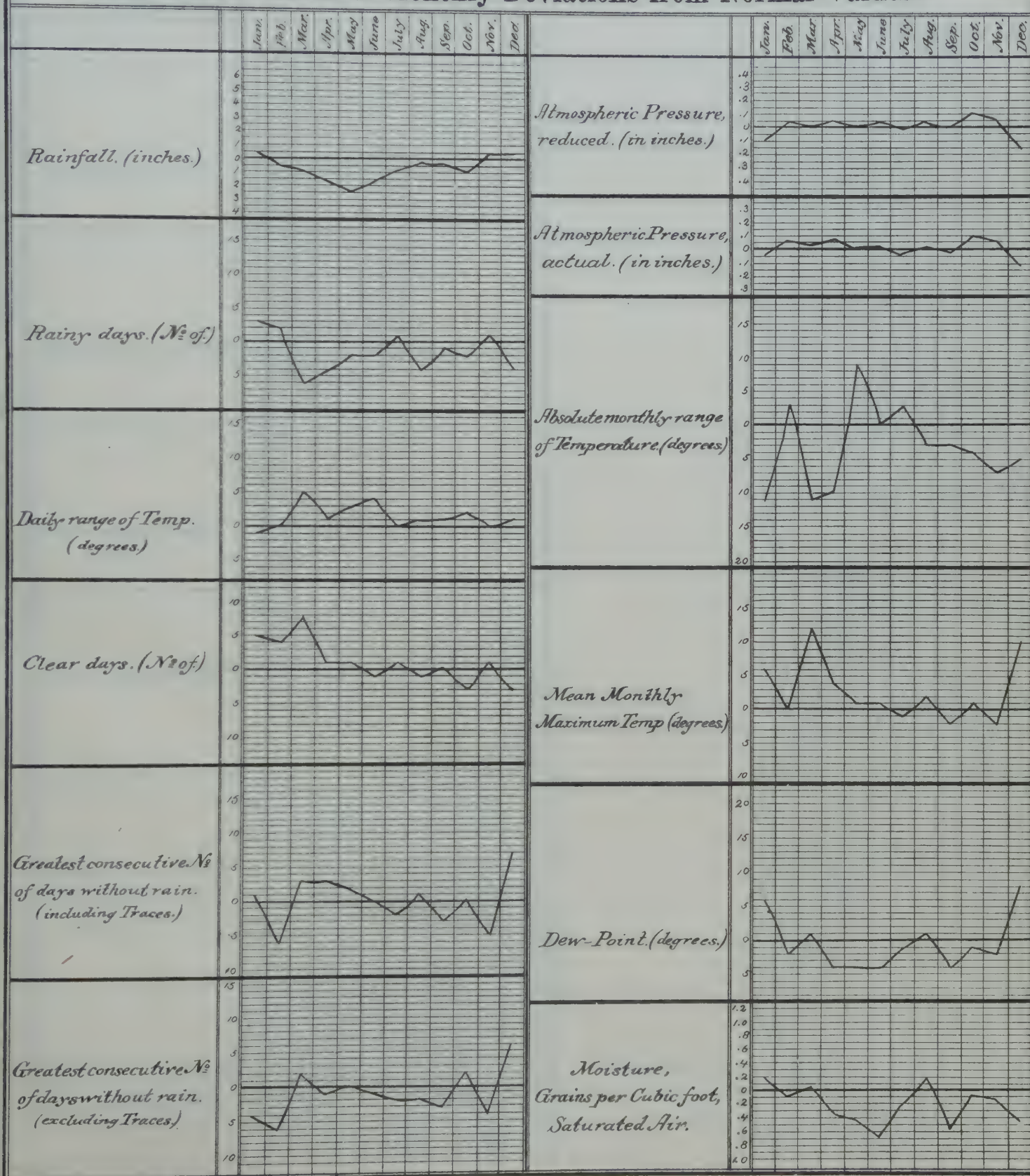
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Yankton, S. Dakota.

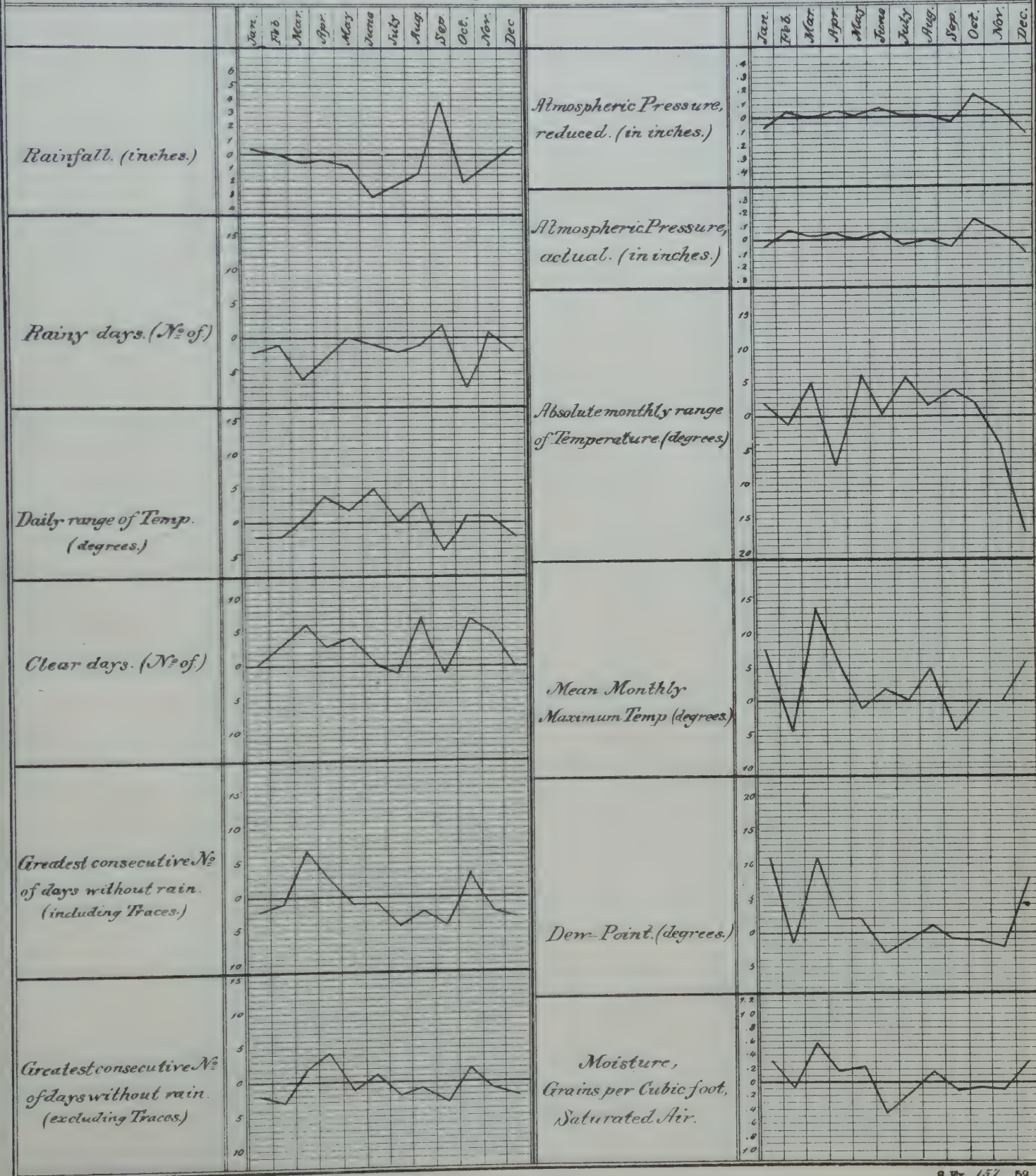
1889.

Comparative Curves of Monthly Deviations from Normal Values.



Moorhead, Minn. 1889.

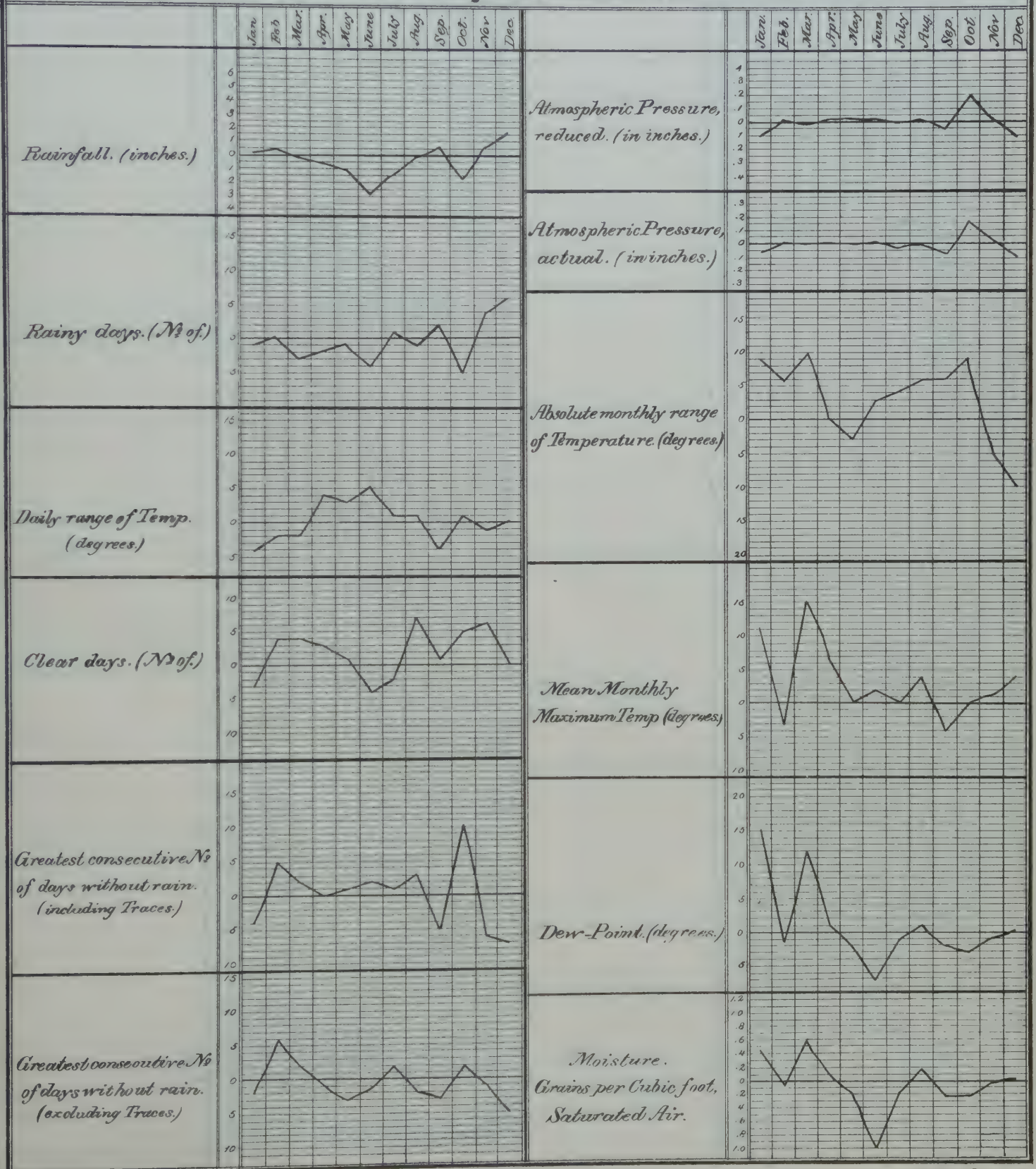
Comparative Curves of Monthly Deviations from Normal Values.



Saint Vincent, Minn.

1889.

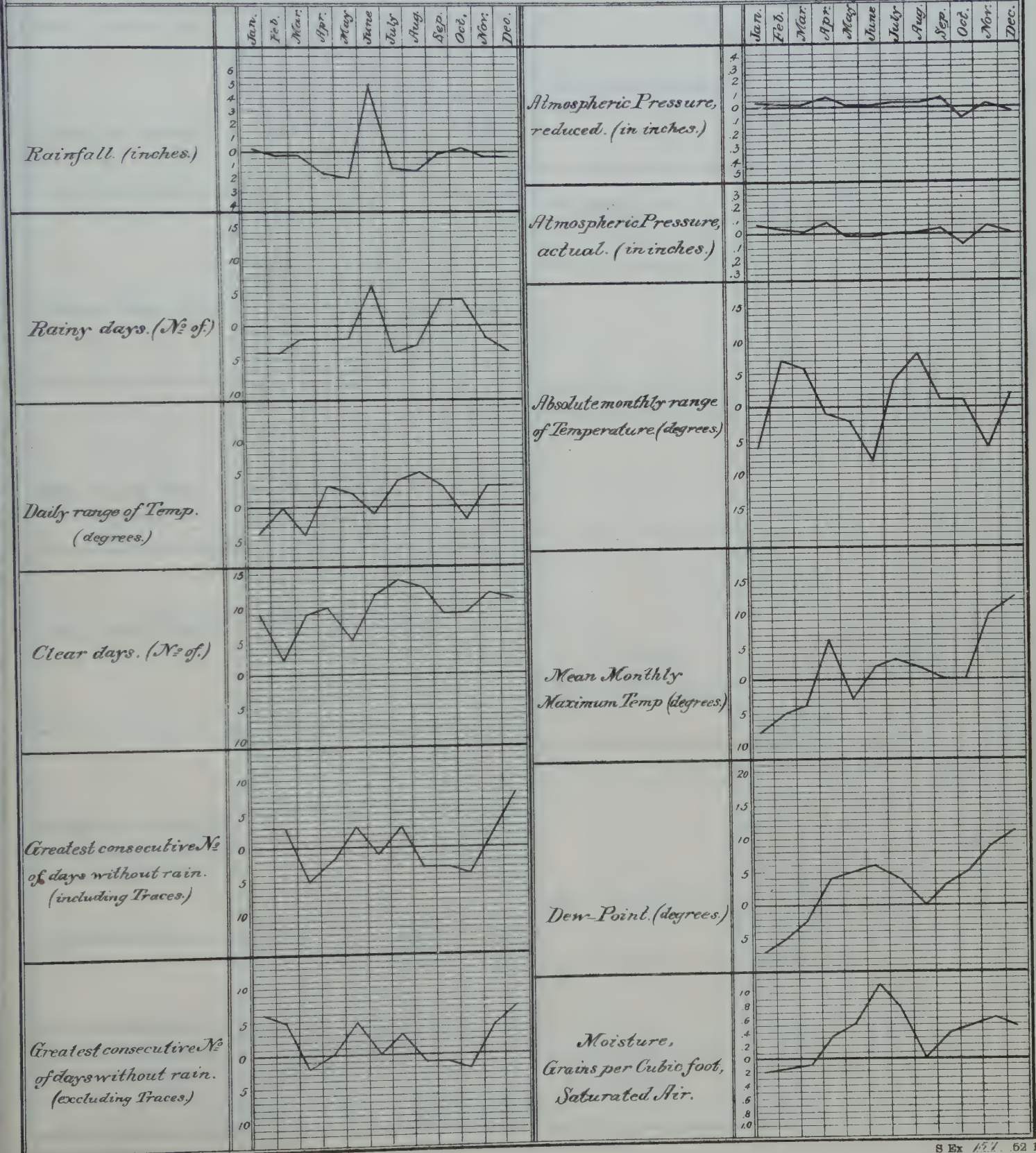
Comparative Curves of Monthly Deviations from Normal Values.



Bismarck, N. Dakota.

1890

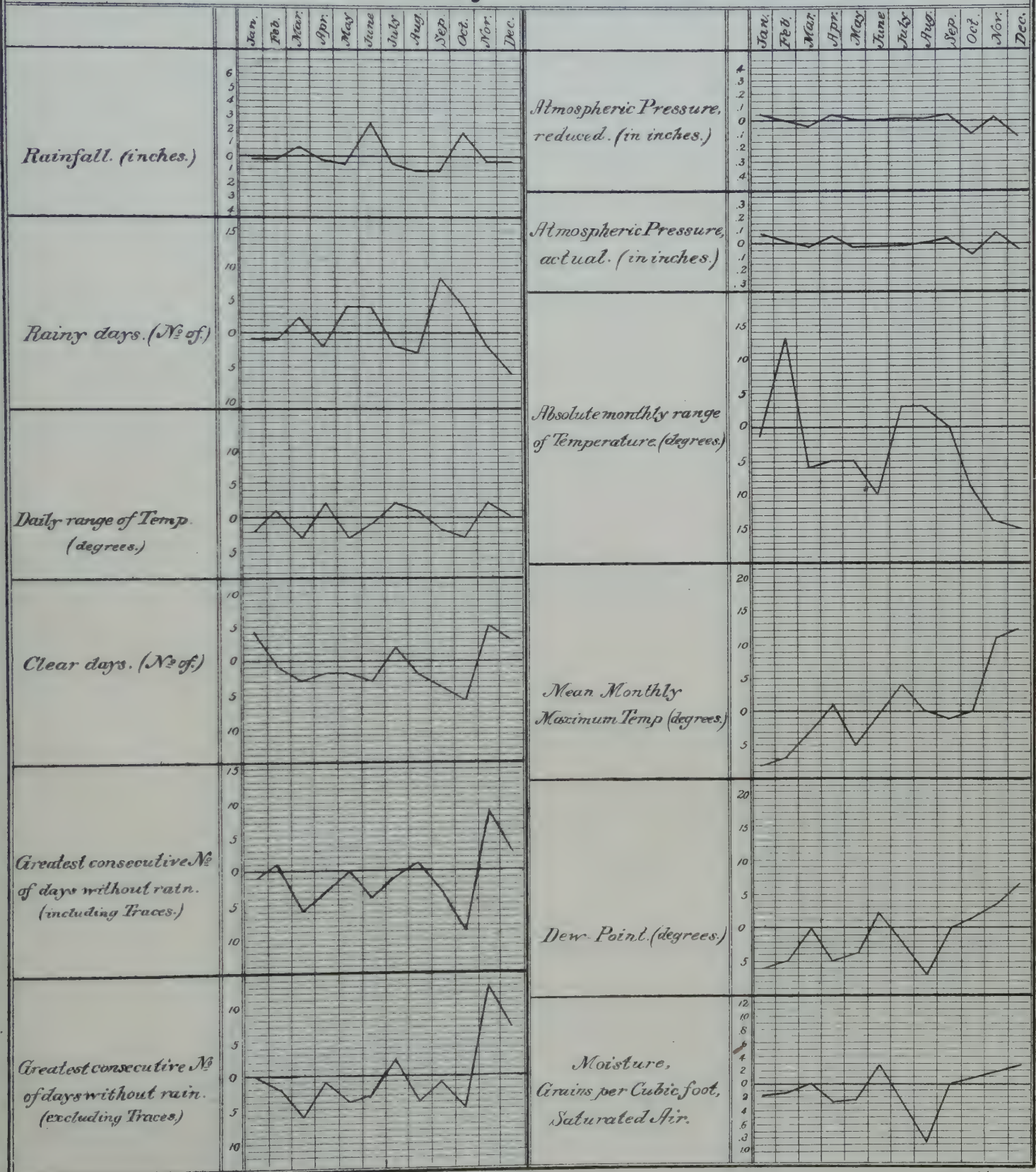
Comparative Curves of Monthly Deviations from Normal Values.



Fort Buford, N. Dakota.

1890.

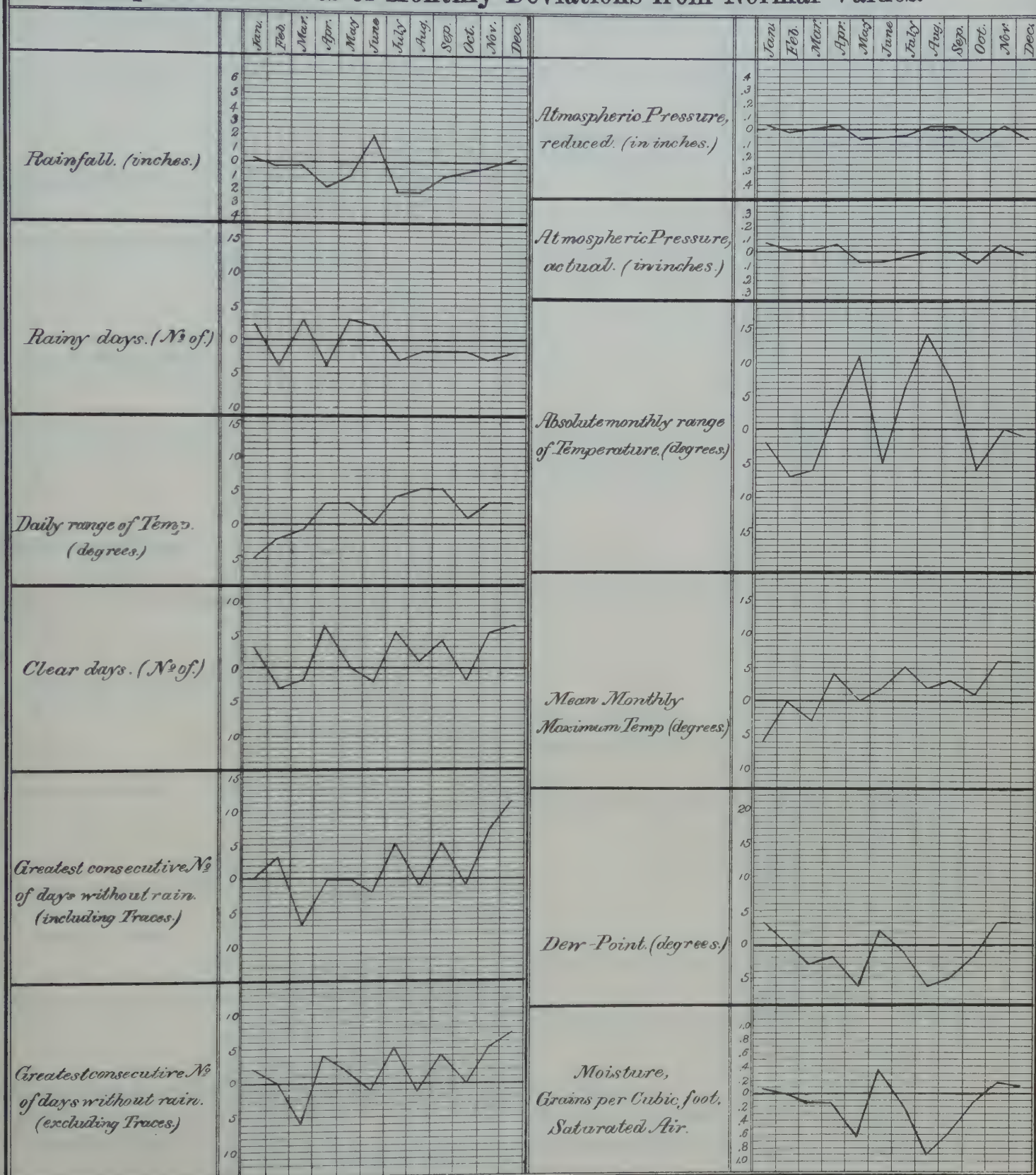
Comparative Curves of Monthly Deviations from Normal Values.



Huron, S. Dakota.

1890.

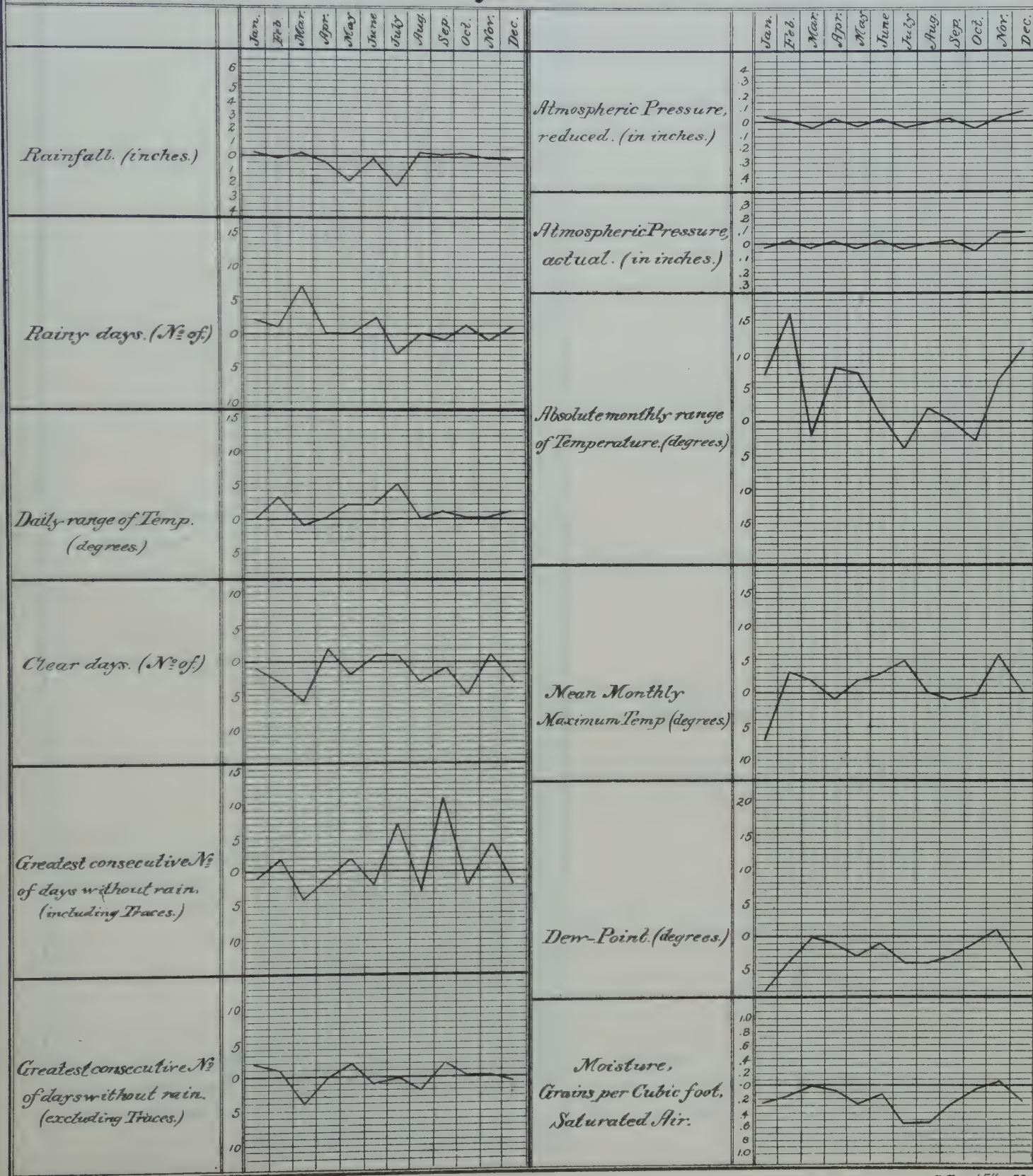
Comparative Curves of Monthly Deviations from Normal Values.



Rapid City, S. Dakota.

1890.

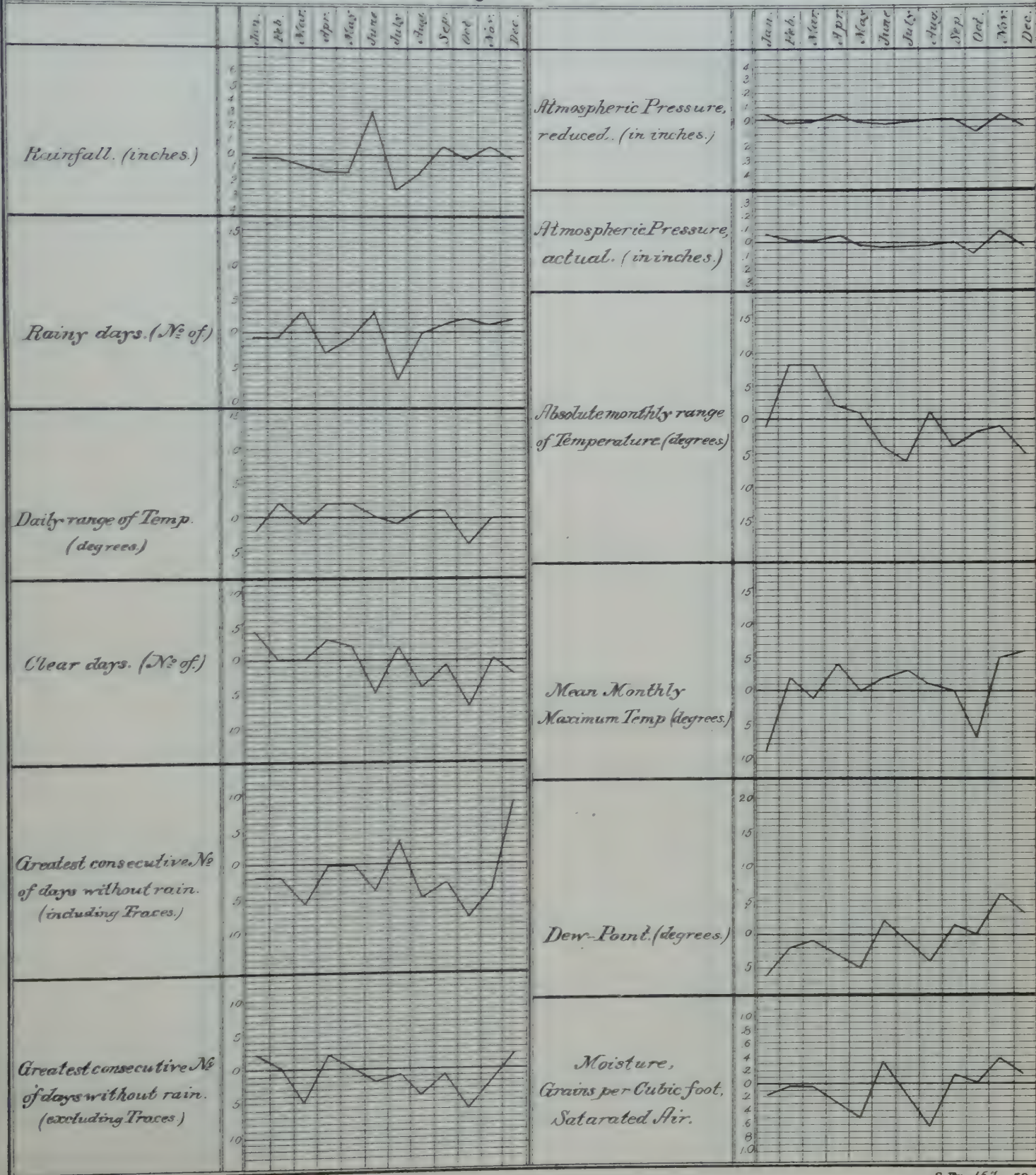
Comparative Curves of Monthly Deviations from Normal Values.



Fort Sully, S. Dakota.

1890.

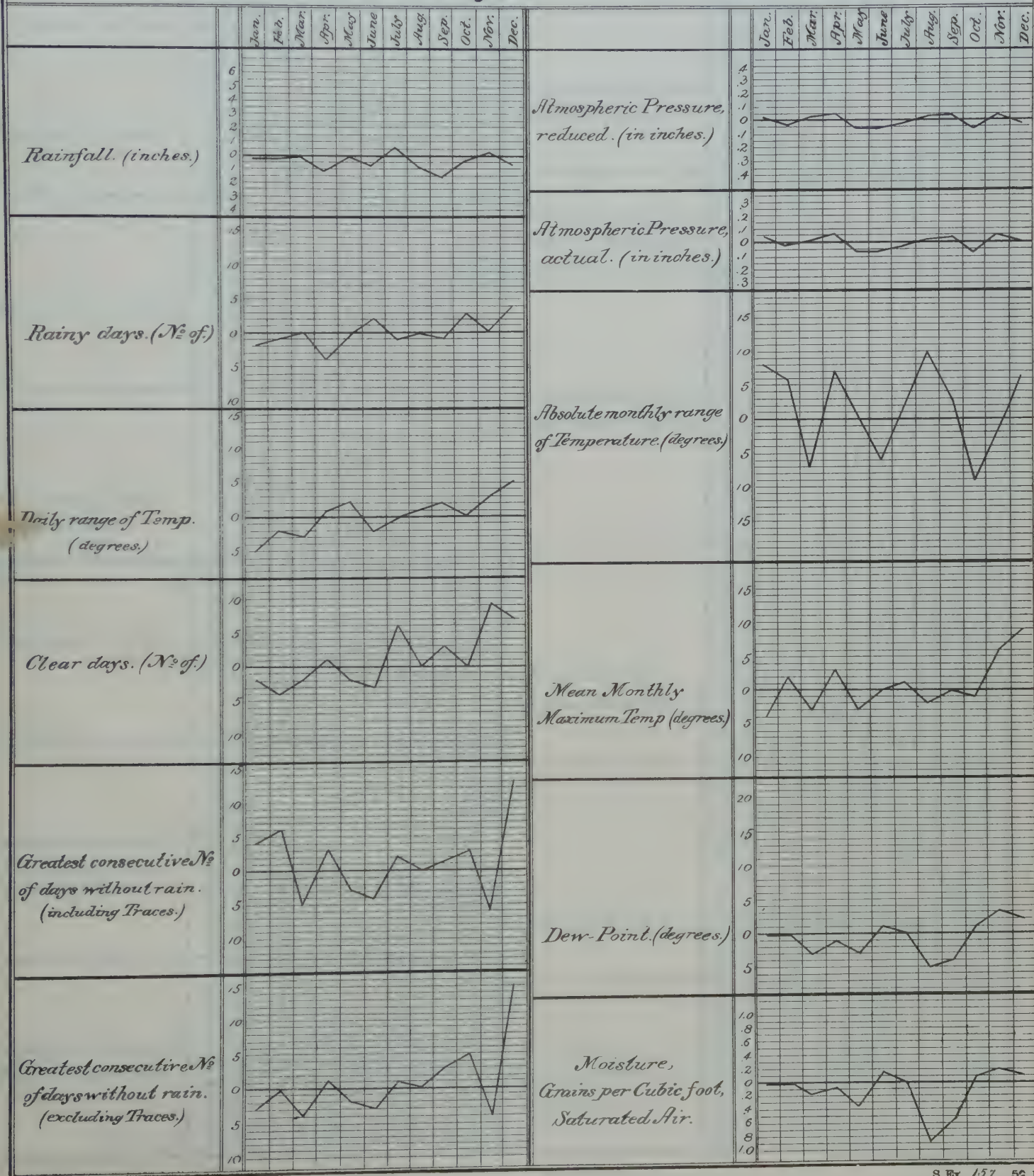
Comparative Curves of Monthly Deviations from Normal Values.



Yankton, S. Dakota.

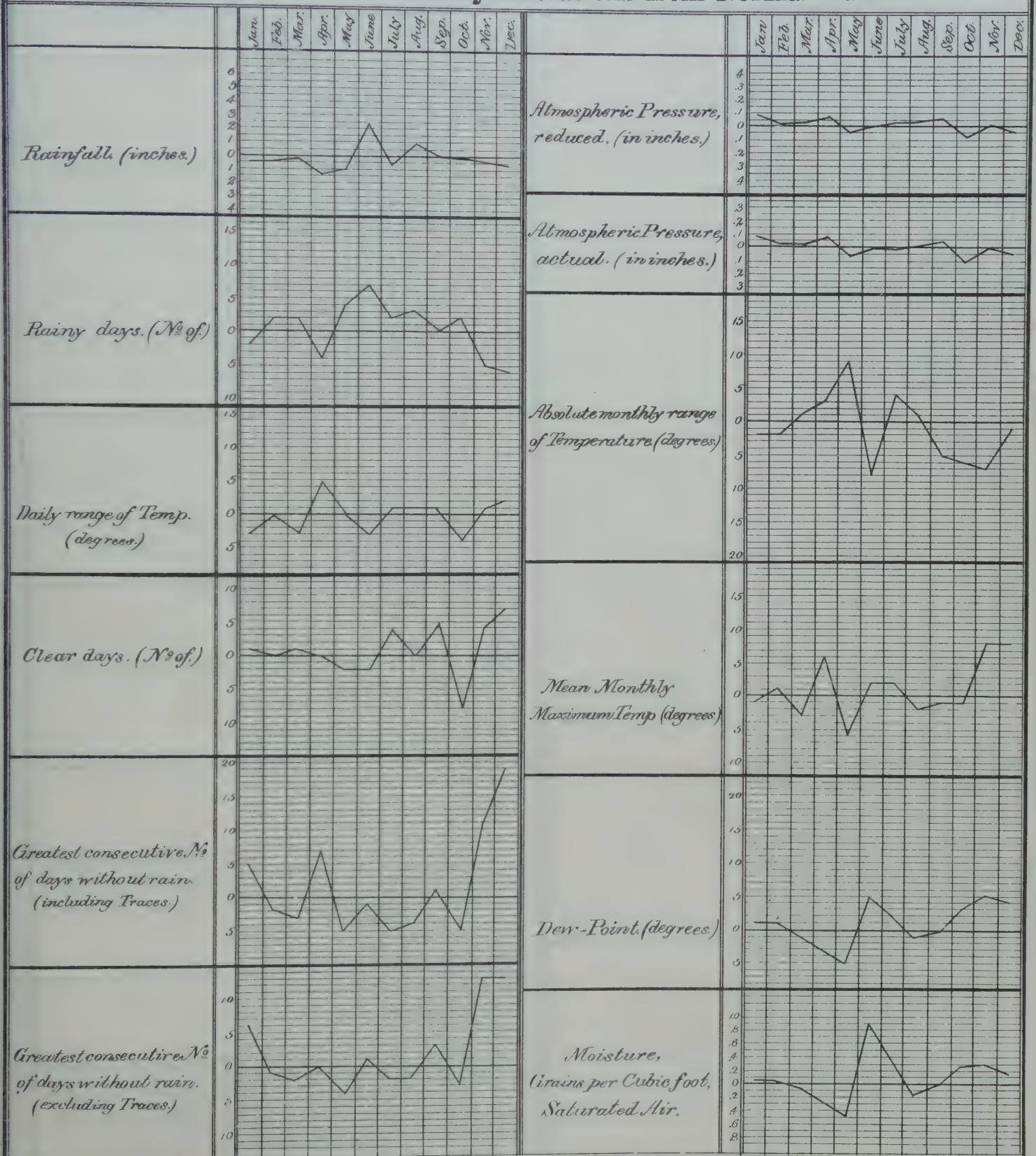
1890.

Comparative Curves of Monthly Deviations from Normal Values.



Moorhead, Minn. 1890.

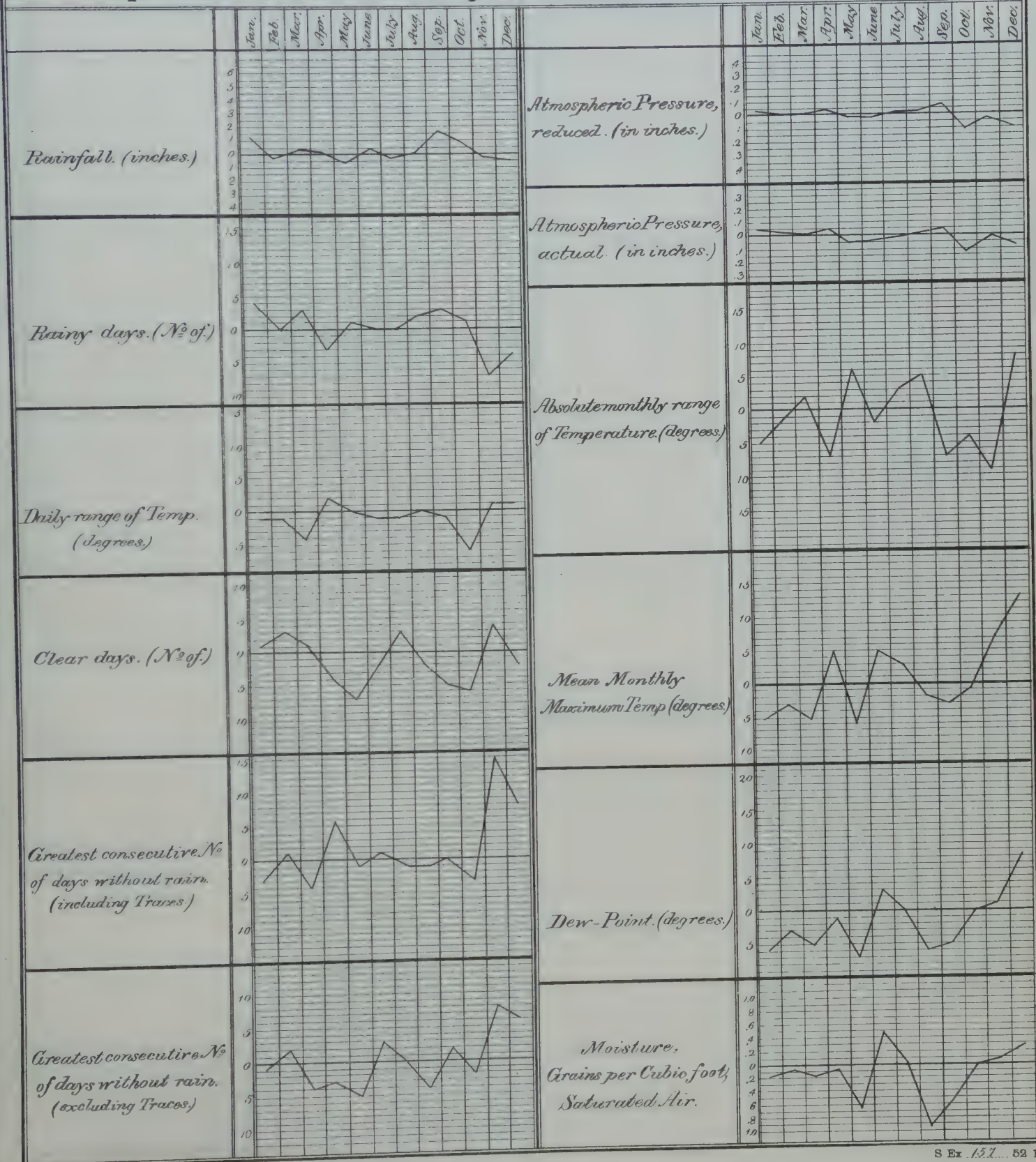
Comparative Curves of Monthly Deviations from Normal Values.



Saint Vincent, Minn.

1890.

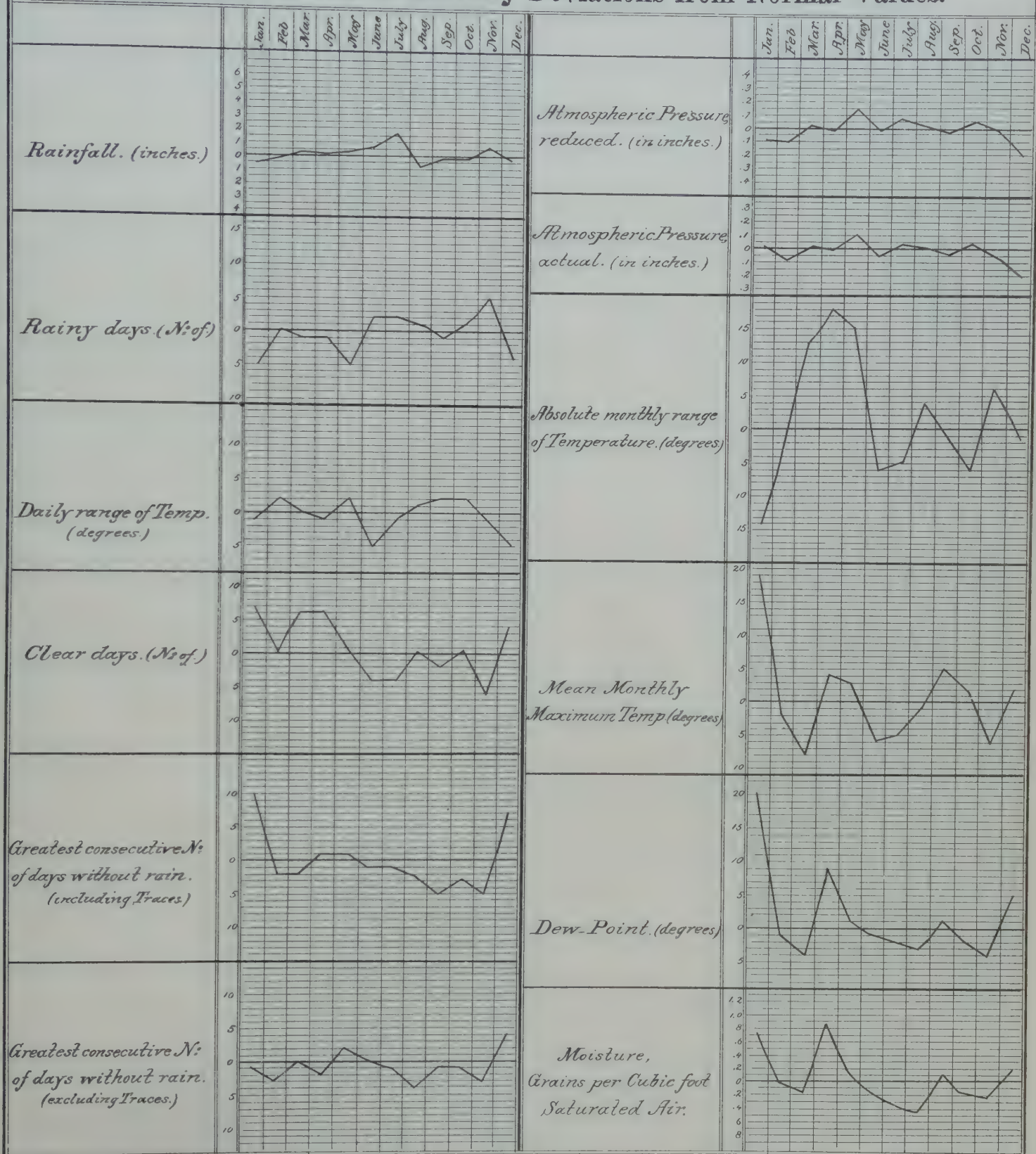
Comparative Curves of Monthly Deviations from Normal Values.



Bismarck, N. Dakota.

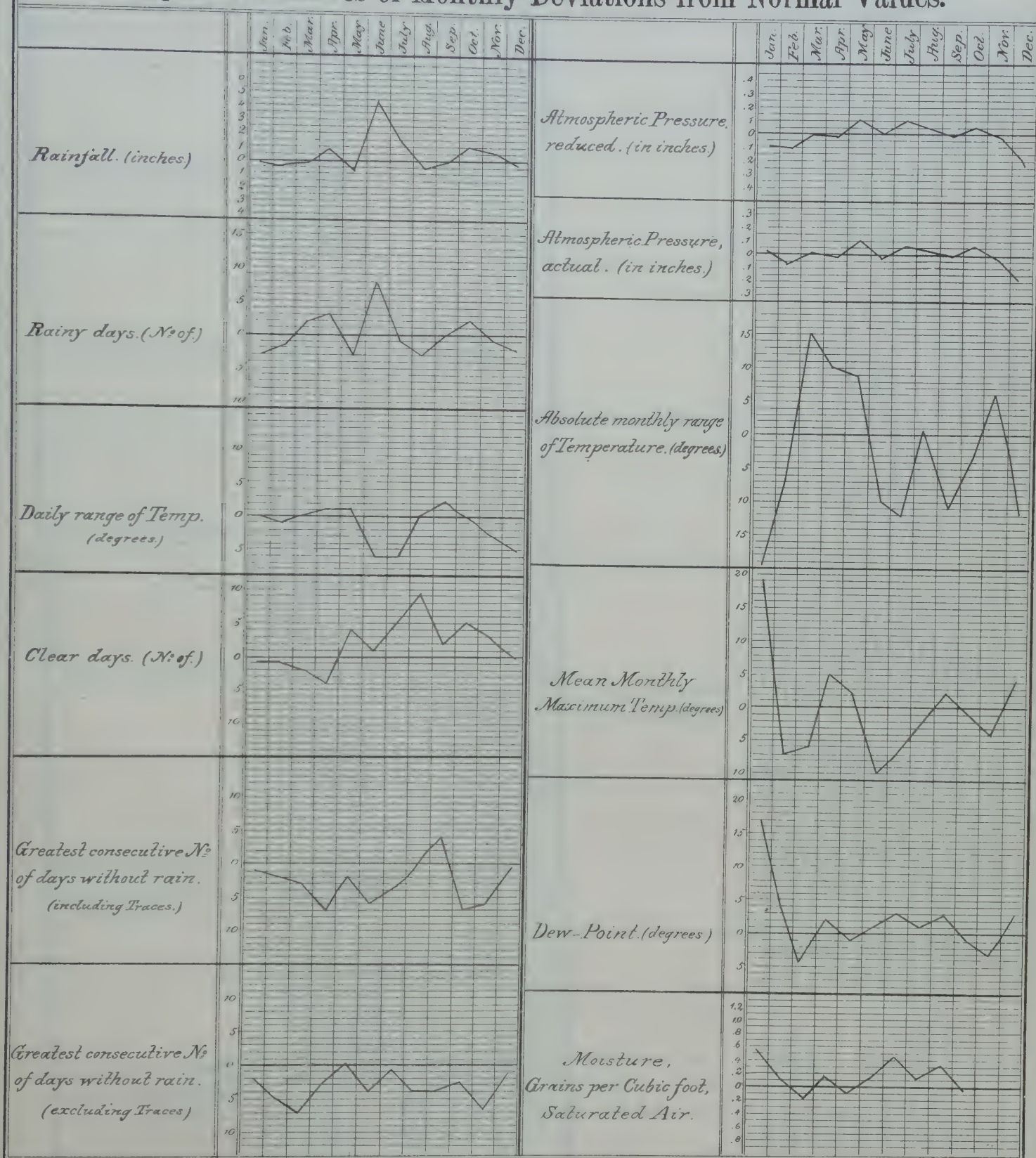
1891.

Comparative Curves of Monthly Deviations from Normal Values.



Fort Buford, N. Dakota. 1891.

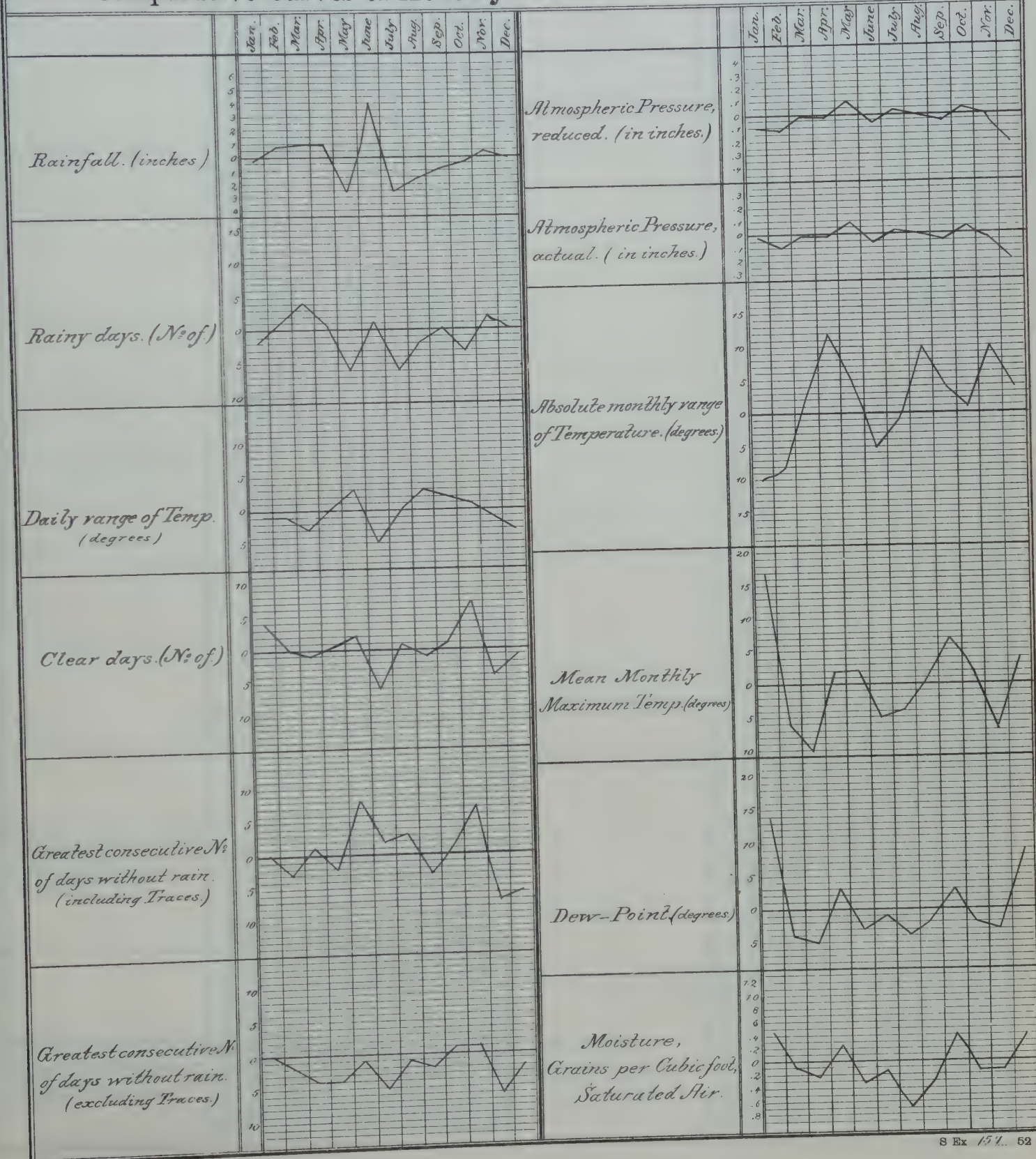
Comparative Curves of Monthly Deviations from Normal Values.



Huron, S. Dakota.

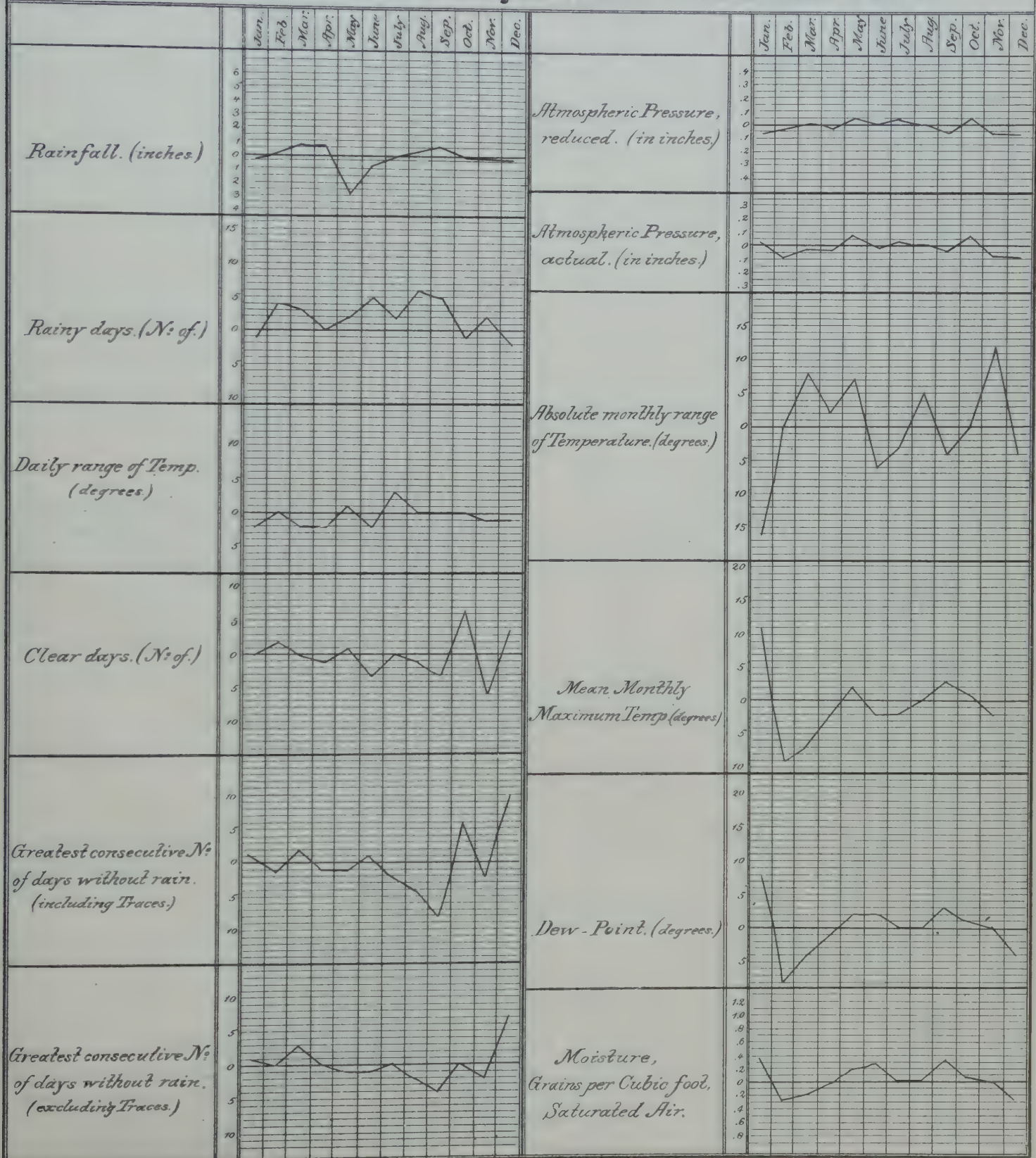
1891.

Comparative Curves of Monthly Deviations from Normal Values.



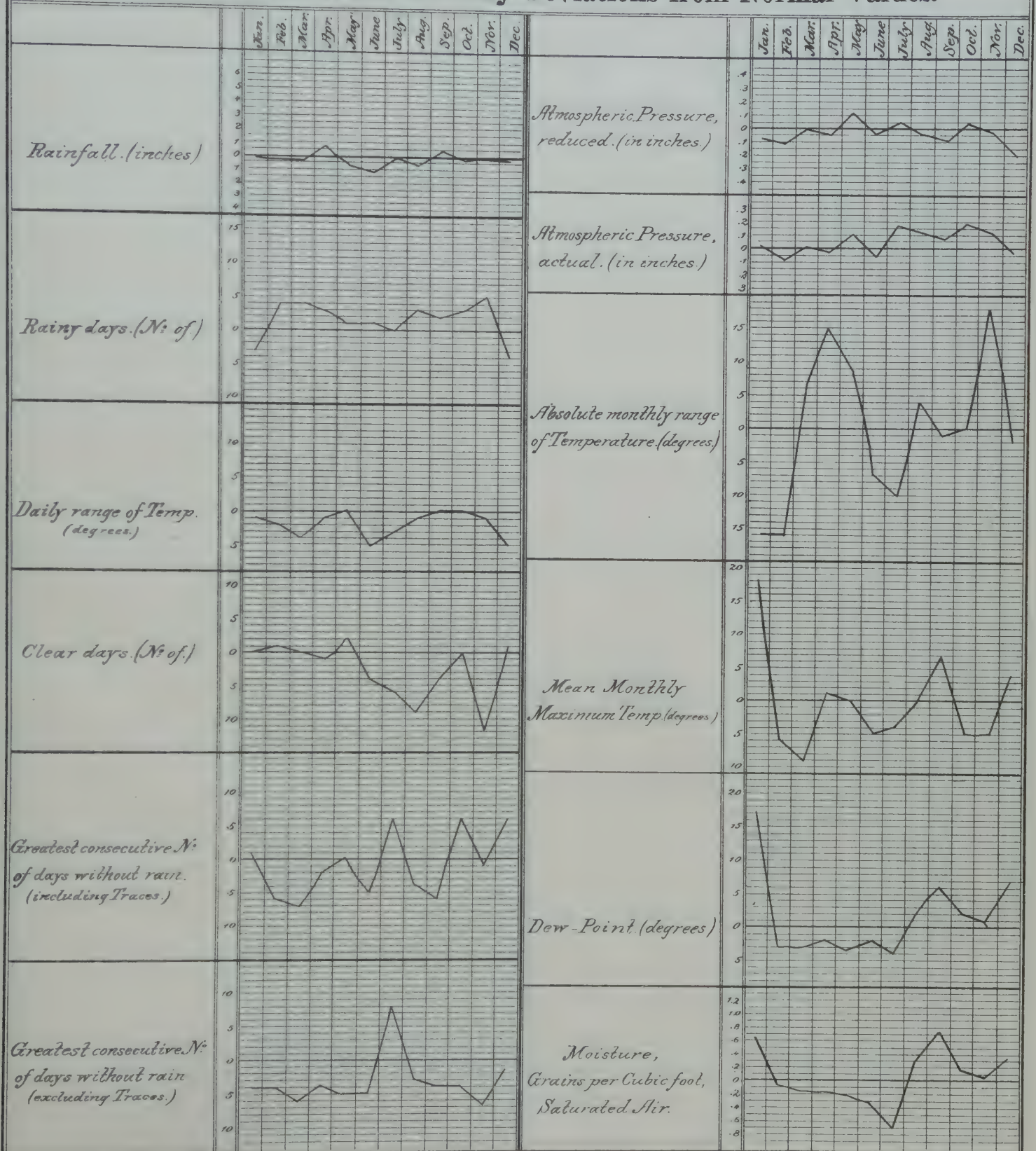
Rapid City, S. Dakota. 1891.

Comparative Curves of Monthly Deviations from Normal Values.



Fort Sully, S. Dakota. 1891.

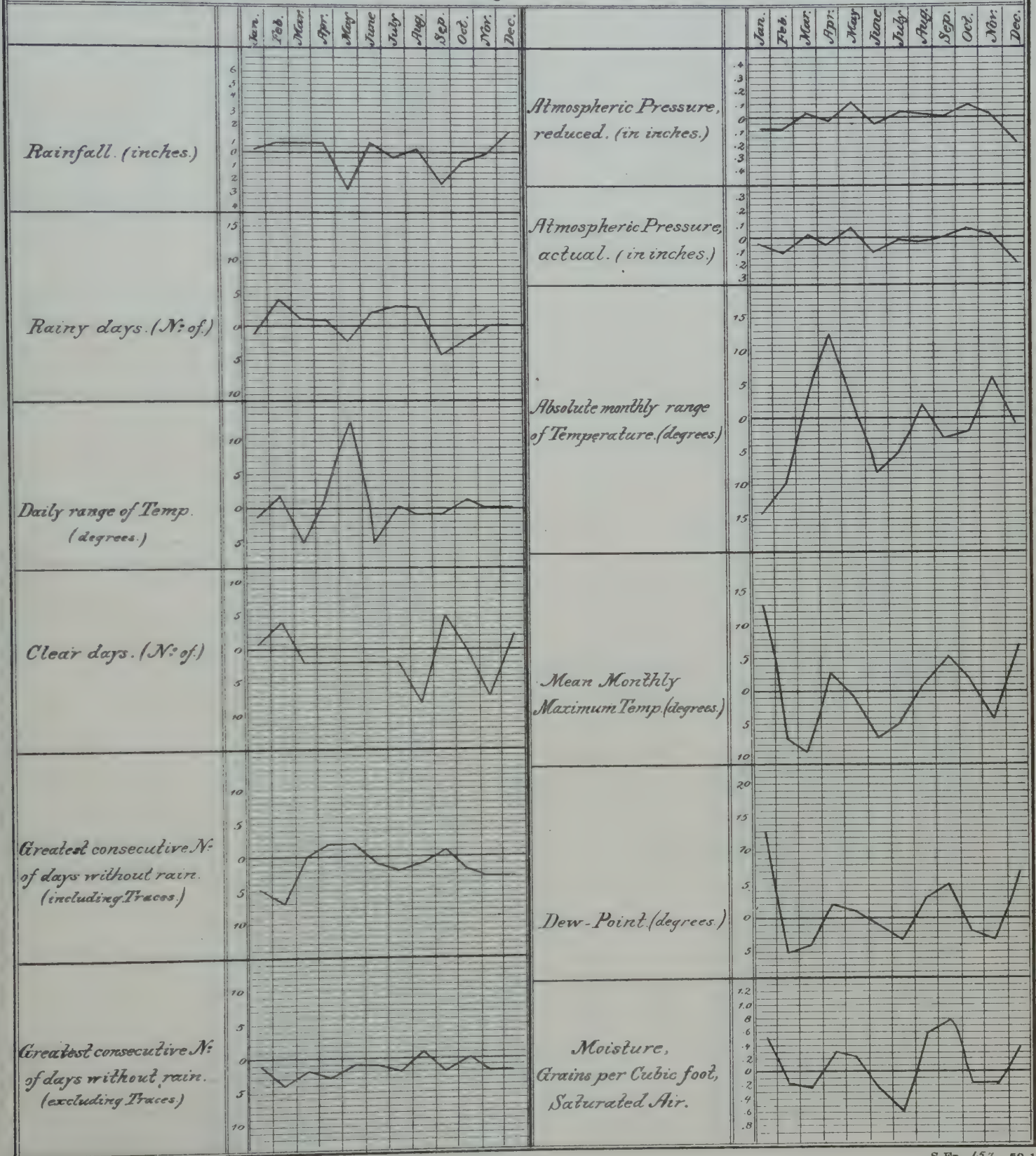
Comparative Curves of Monthly Deviations from Normal Values.



Yankton, S. Dakota.

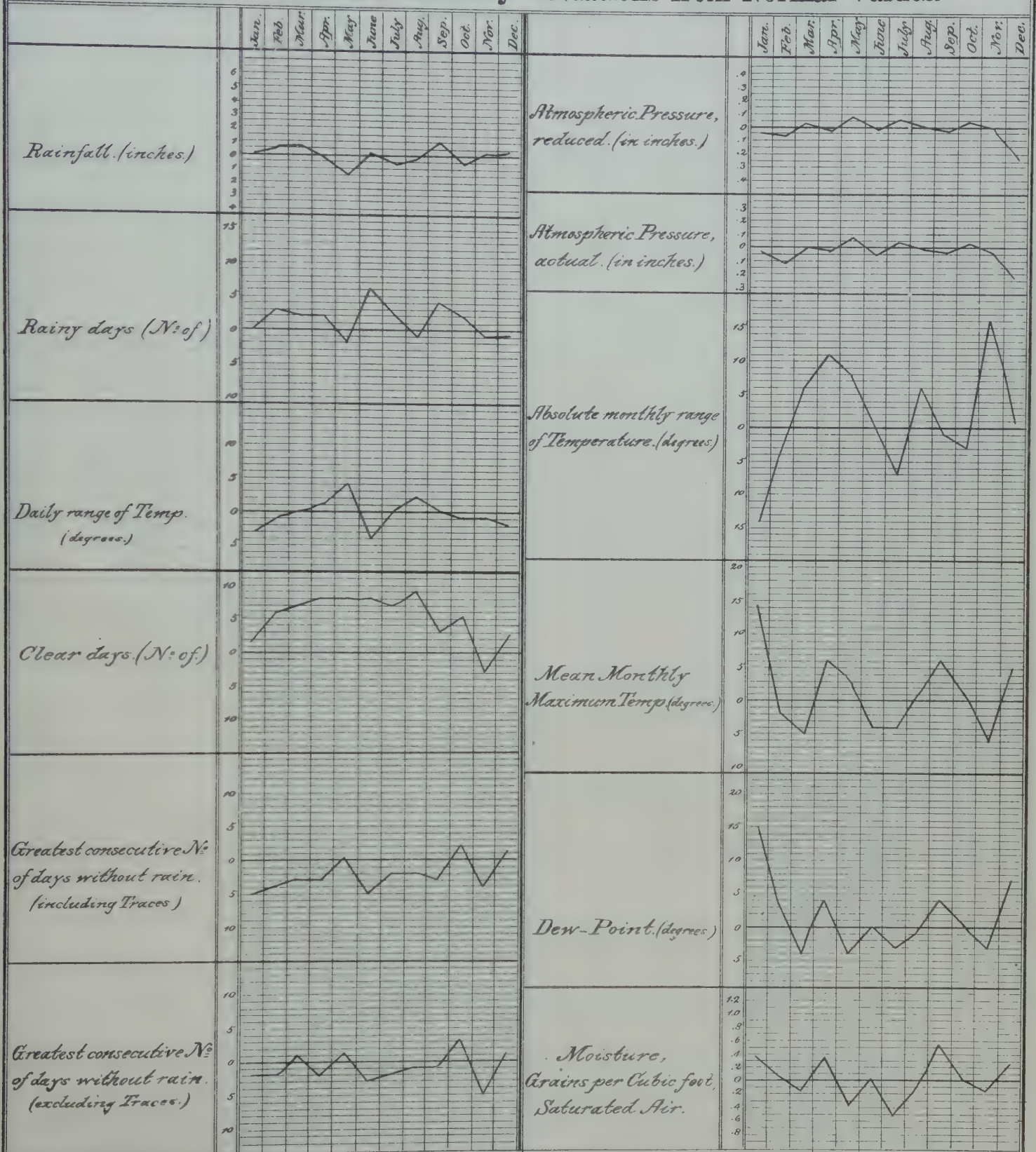
1891.

Comparative Curves of Monthly Deviations from Normal Values.



Moorhead, Minn. 1891.

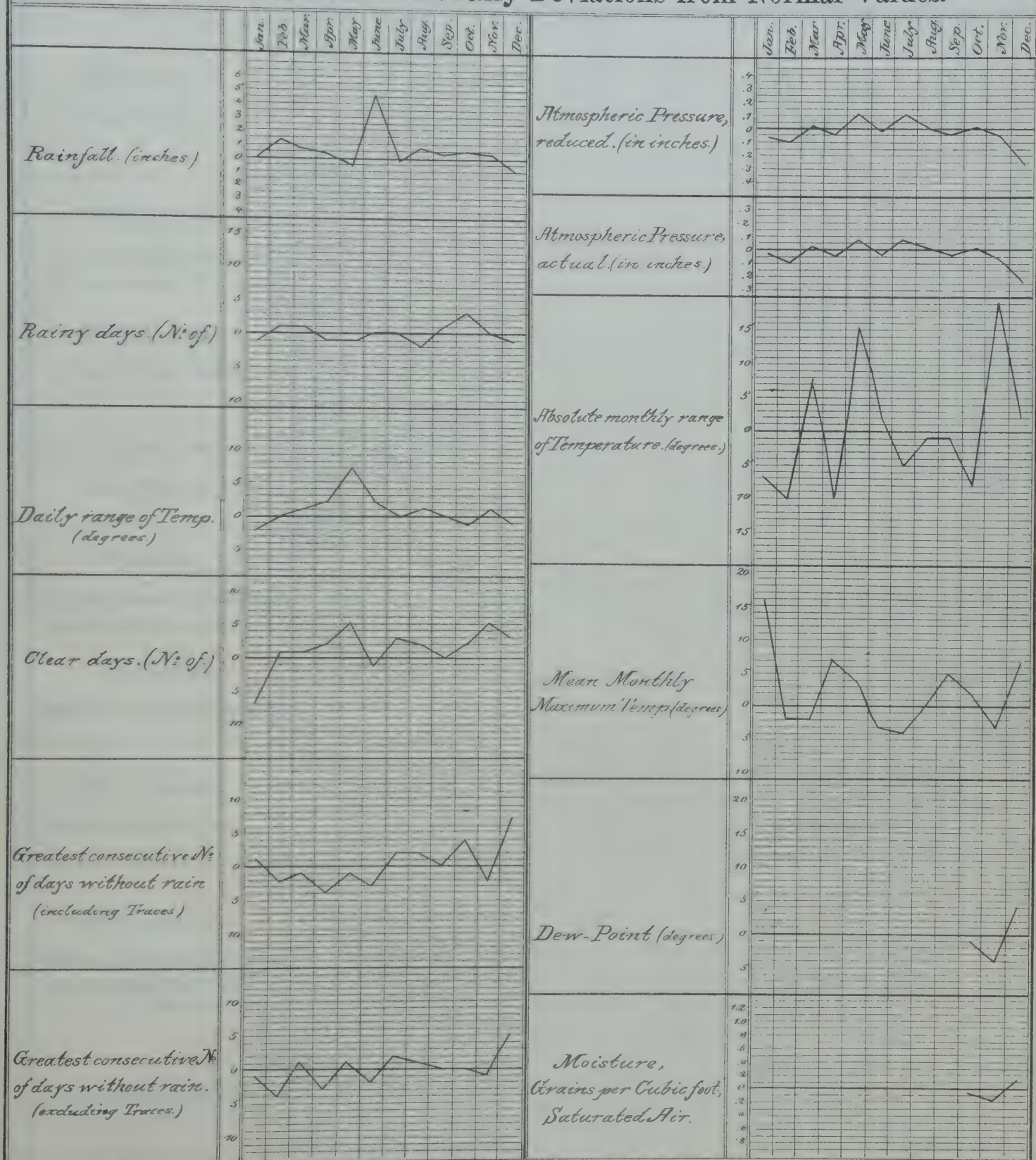
Comparative Curves of Monthly Deviations from Normal Values.



Saint Vincent, Minn.

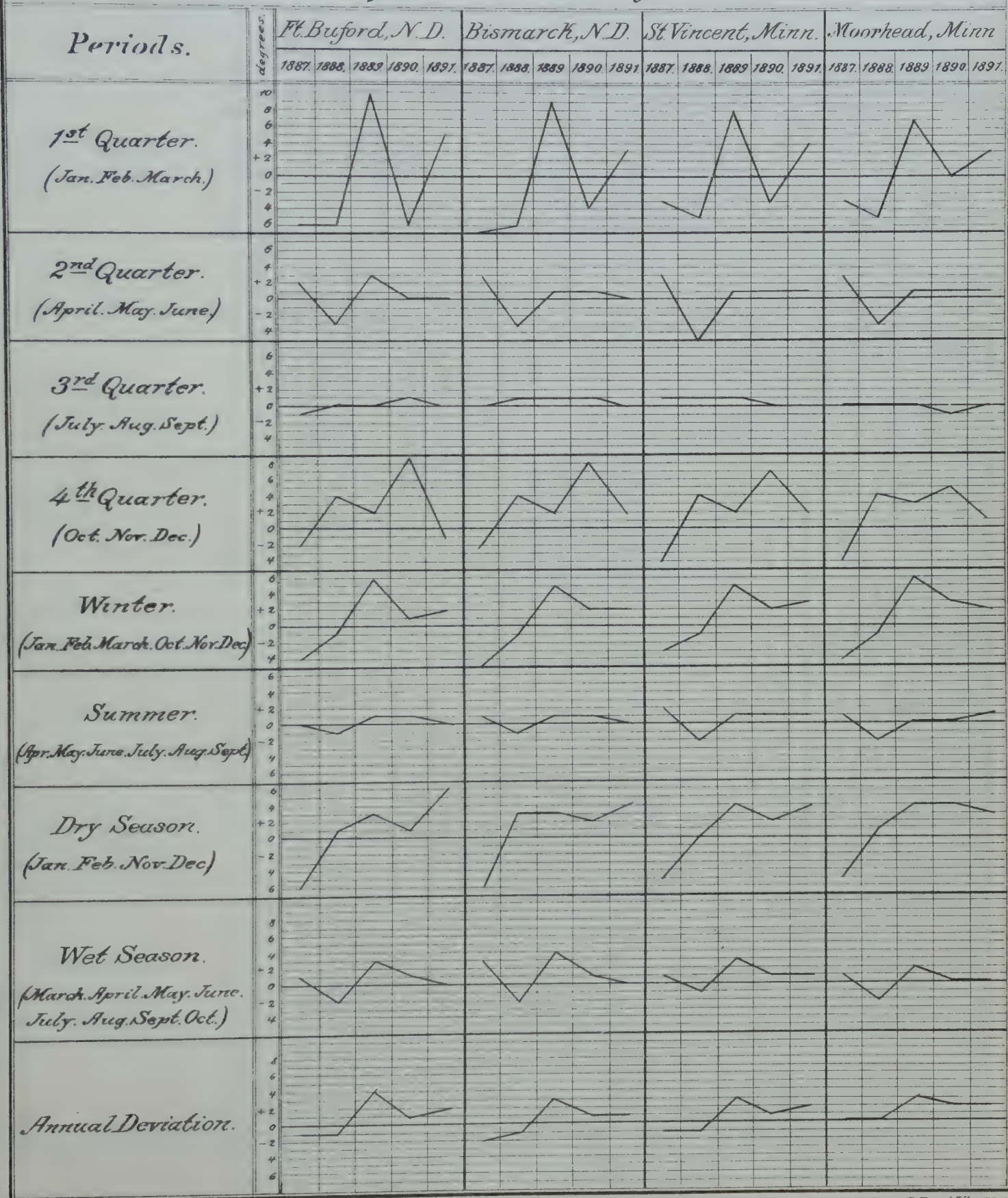
1891.

Comparative Curves of Monthly Deviations from Normal Values.



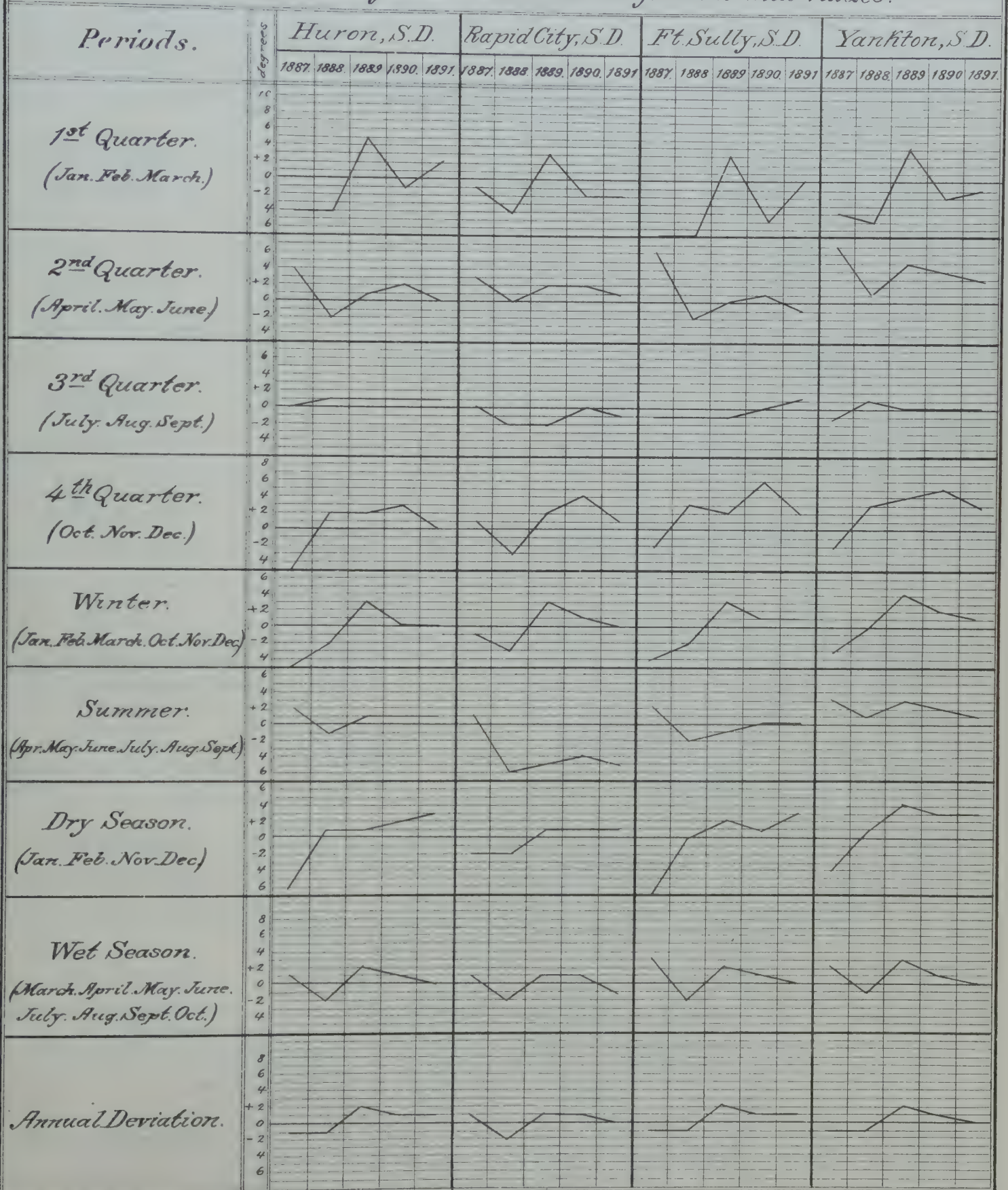
Temperature.

Comparative Curves of Seasonal Deviations from Normal Values.



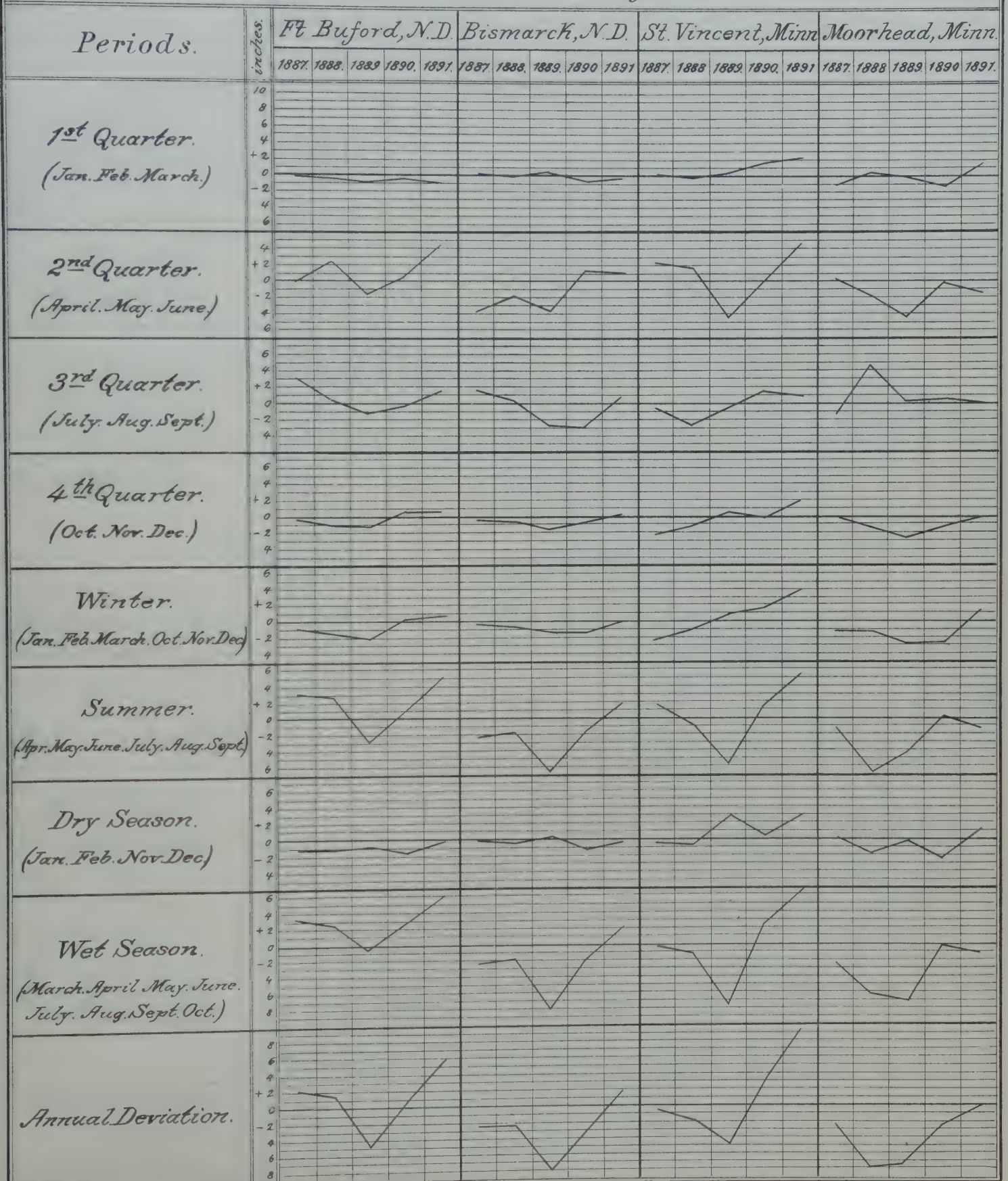
Temperature.

Comparative Curves of Seasonal Deviations from Normal Values.



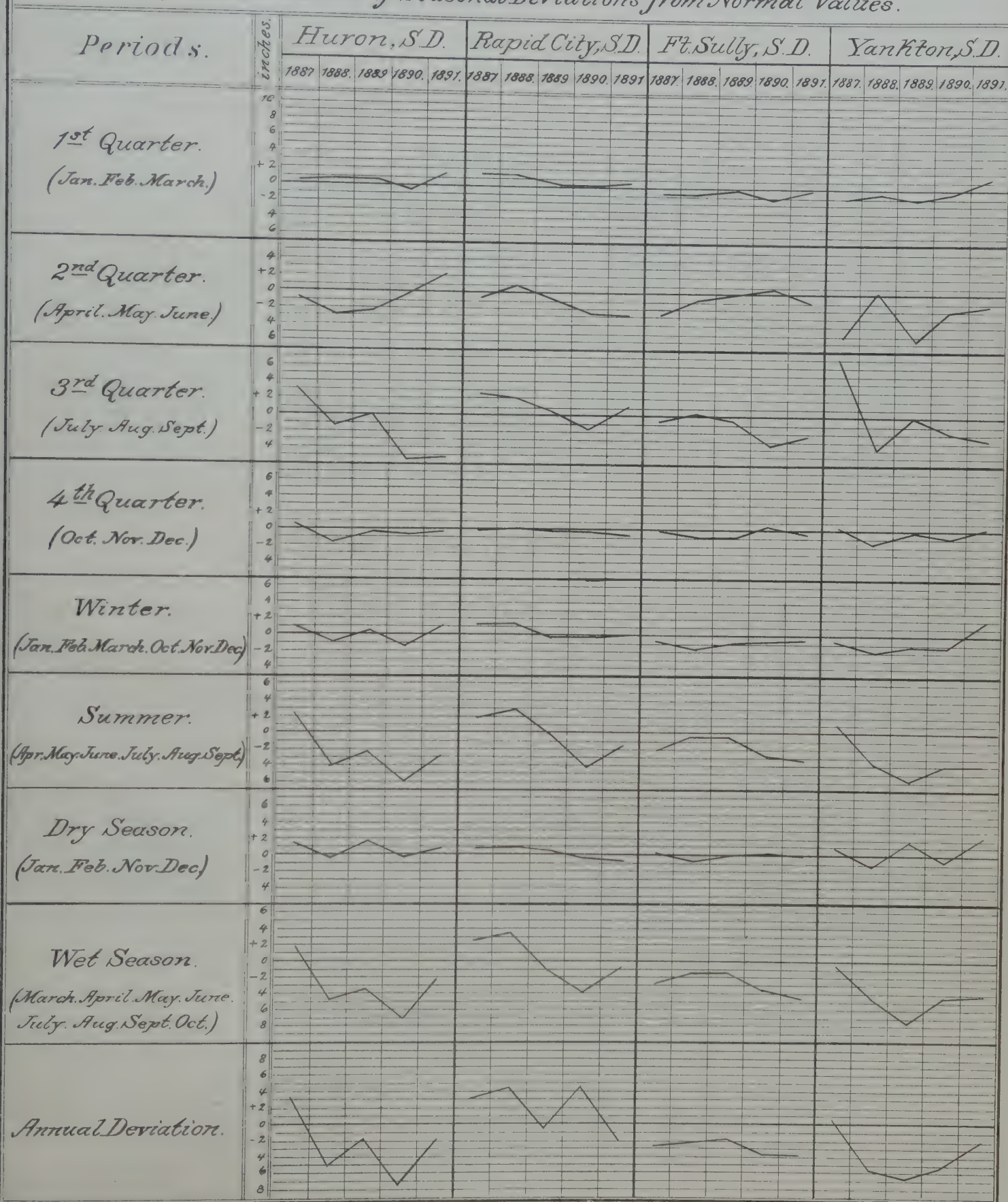
Precipitation.

Comparative Curves of Seasonal Deviations from Normal Values.



Precipitation.

Comparative Curves of Seasonal Deviations from Normal Values.



APPENDIX NO. 143.

Number of areas of low pressure traversing the region inclosed by the parallels of 42° and 54° north latitude and the meridians of 95° and 105° west longitude.

Year,	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1882	5	5	6	6	3	4	4	5	1	10	3	3	55
1883	7	2	5	2	2	2	6	4	5	3	6	7	51
1884	5	6	5	4	7	3	4	7	12	11	6	1	71
1885	8	5	6	2	5	4	7	4	4	3	4	4	56
1886	4	6	7	4	8	3	5	7	7	5	9	4	69
1887	9	2	8	9	8	4	3	5	7	7	7	4	73
1888	4	5	5	8	3	8	4	4	5	7	1	4	58
1889	3	6	2	5	2	5	9	5	7	7	2	7	60
1890	5	6	5	6	8	4	6	8	6	4	7	9	74
1891	6	6	5	5	5	6	6	8	9	7	9	9	81
Means	6	5	5	5	5	4	5	6	6	6	5	5	65

APPENDIX NO. 144.

Average number of centers of low pressure passing within 150 miles of the station. Five years, 1887-1891.

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
Fort Buford, N. Dak	1	2	2	3	2	3	2	1	2	2	1	1	22
Bismarck, N. Dak	2	2	2	3	2	3	3	2	3	2	1	1	26
St. Vincent, Minn	2	2	1	3	3	1	2	3	4	3	2	3	29
Moorhead, Minn	1	2	1	2	2	2	2	2	2	2	1	2	21
Huron, S. Dak	2	2	2	3	2	2	3	2	1	2	1	2	24
Rapid City, S. Dak	3	2	2	2	2	3	3	2	1	1	1	2	24
Fort Sully, S. Dak	2	1	2	2	2	3	4	2	2	1	1	2	24
Yankton, S. Dak	2	2	2	3	2	1	3	2	1	2	1	2	23
Means	2	2	2	3	2	2	3	2	2	2	1	2	24

APPENDIX No. 145.

Mean monthly actual barometric pressure.

[All observations corrected for temperature and instrumental error only. Fifteen-year normals from "Hazen's Tables."]

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Bismarck, N. Dak	28.22	28.22	28.21	28.15	28.12	28.12	28.17	28.18	28.18 ²	28.18	28.21	28.22
St. Vincent, Minn	9.21	9.22	9.19	9.13	9.08	9.04	9.06	9.08	9.09	9.12	9.17	9.20
Moorhead, Minn	9.07	9.06	9.04	8.96	8.93	8.90	8.95	8.97	8.97	8.98	9.03	9.06
Fort Buford, N. Dak	7.96	7.98	7.96	7.92	7.89	7.87	7.93	7.94	7.95	7.96	7.97	8.00
Deadwood, S. Dak	5.25	5.26	5.30	5.30	5.33	5.37	5.44	5.44	5.43	5.39	5.35	5.30
Huron, S. Dak	8.68	8.66	8.64	8.56	8.54	8.53	8.58	8.59	8.61	8.61	8.65	8.68
Rapid City, S. Dak. ¹	6.62	6.56	6.59	6.61	6.57	6.53	6.64	6.65	6.65	6.64	6.66	6.56
Yankton, S. Dak	8.78	8.76	8.72	8.64	8.62	8.62	8.66	8.68	8.69	8.71	8.74	8.77
Fort Sully, S. Dak	8.35	8.34	8.31	8.26	8.21	8.21	8.27	8.29	8.30	8.31	8.34	8.36
Valentine, Nebr. ²	7.30	7.28	7.29	7.26	7.25	7.23	7.30	7.31	7.31	7.33	7.32	7.28

¹ 1888-1891.

² September, 1885-December, 1891.

APPENDIX No. 146.

Mean monthly reduced barometric pressure.

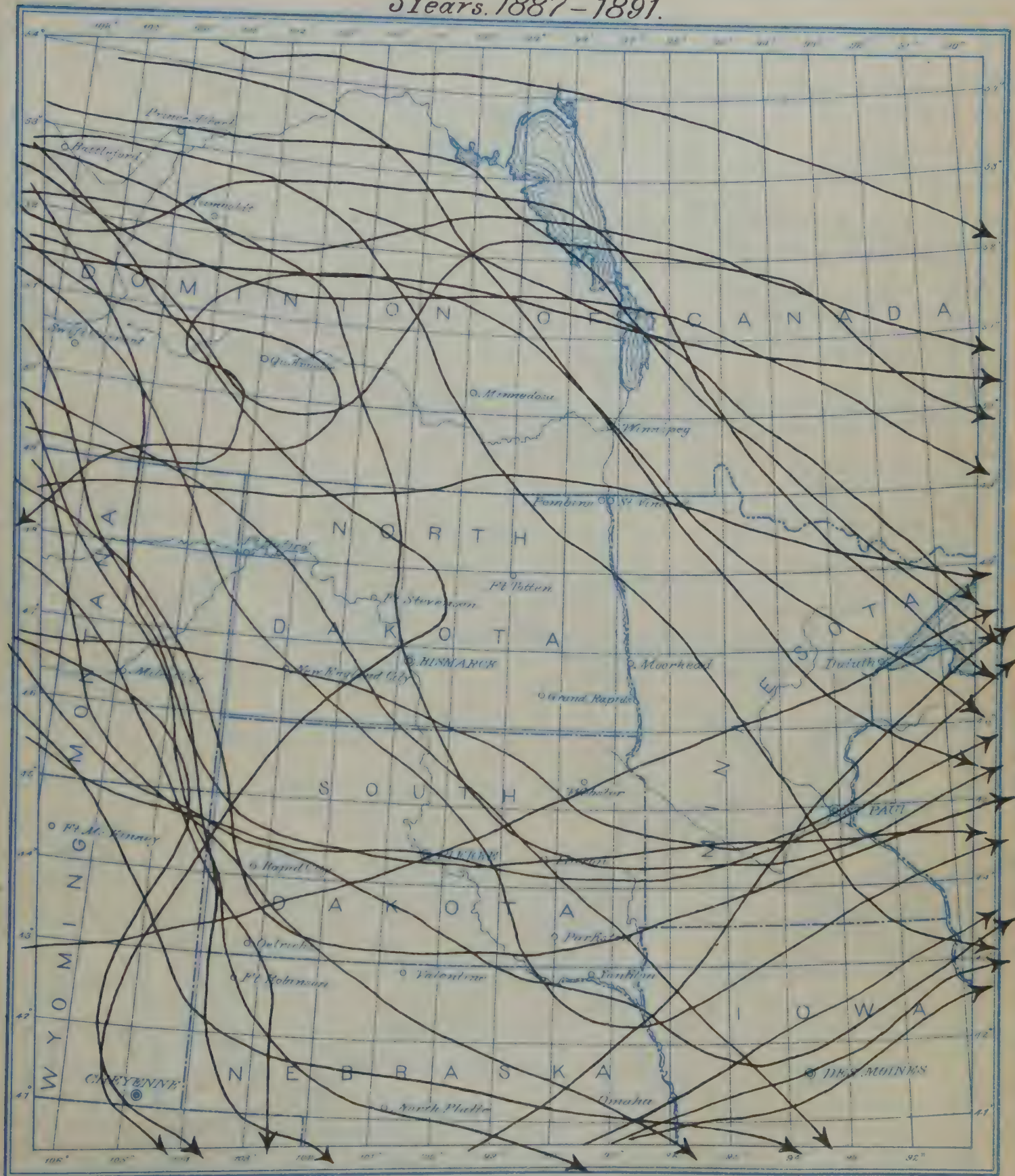
[All observations corrected and reduced to sea level. Fifteen-year normals from "Hazen's Tables."]

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Bismarck, N. Dak	30.19	30.16	30.10	29.97	29.89	29.86	29.90	29.92	29.95	30.00	30.08	30.14
St. Vincent, Minn	0.18	0.18	0.12	0.02	9.94	9.89	9.91	9.93	9.95	0.00	0.09	0.15
Moorhead, Minn	0.17	0.15	0.10	9.98	9.93	9.87	9.91	9.94	9.96	0.00	0.08	0.15
Fort Buford, N. Dak	0.17	0.17	0.08	9.97	9.89	9.84	9.88	9.90	9.95	0.01	0.08	0.17
Deadwood, S. Dak	0.18	0.17	0.10	0.01	9.93	9.88	9.91	9.91	9.99	0.04	0.14	0.18
Huron, S. Dak	0.21	0.17	0.10	9.98	9.93	9.90	9.94	9.95	0.00	0.03	0.11	0.19
Rapid City, S. Dak. ¹	0.19	0.12	0.09	0.00	9.93	9.82	9.89	9.92	9.97	0.04	0.14	0.05
Yankton, S. Dak	0.20	0.16	0.09	9.97	9.92	9.90	9.93	9.95	9.98	0.03	0.11	0.17
Fort Sully, S. Dak	0.20	0.17	0.09	9.99	9.89	9.86	9.91	9.94	9.99	0.03	0.11	0.17
Valentine, Nebr. ²	0.18	0.14	0.10	9.99	9.93	9.86	9.93	9.96	9.99	0.06	0.12	0.11

¹ 1888-1891.

² September, 1885-December, 1891.

Appendix N^o 147.
 Tracks of Areas of Low Pressure. (Storm Centers.)
 January.
 5 Years. 1887-1891.

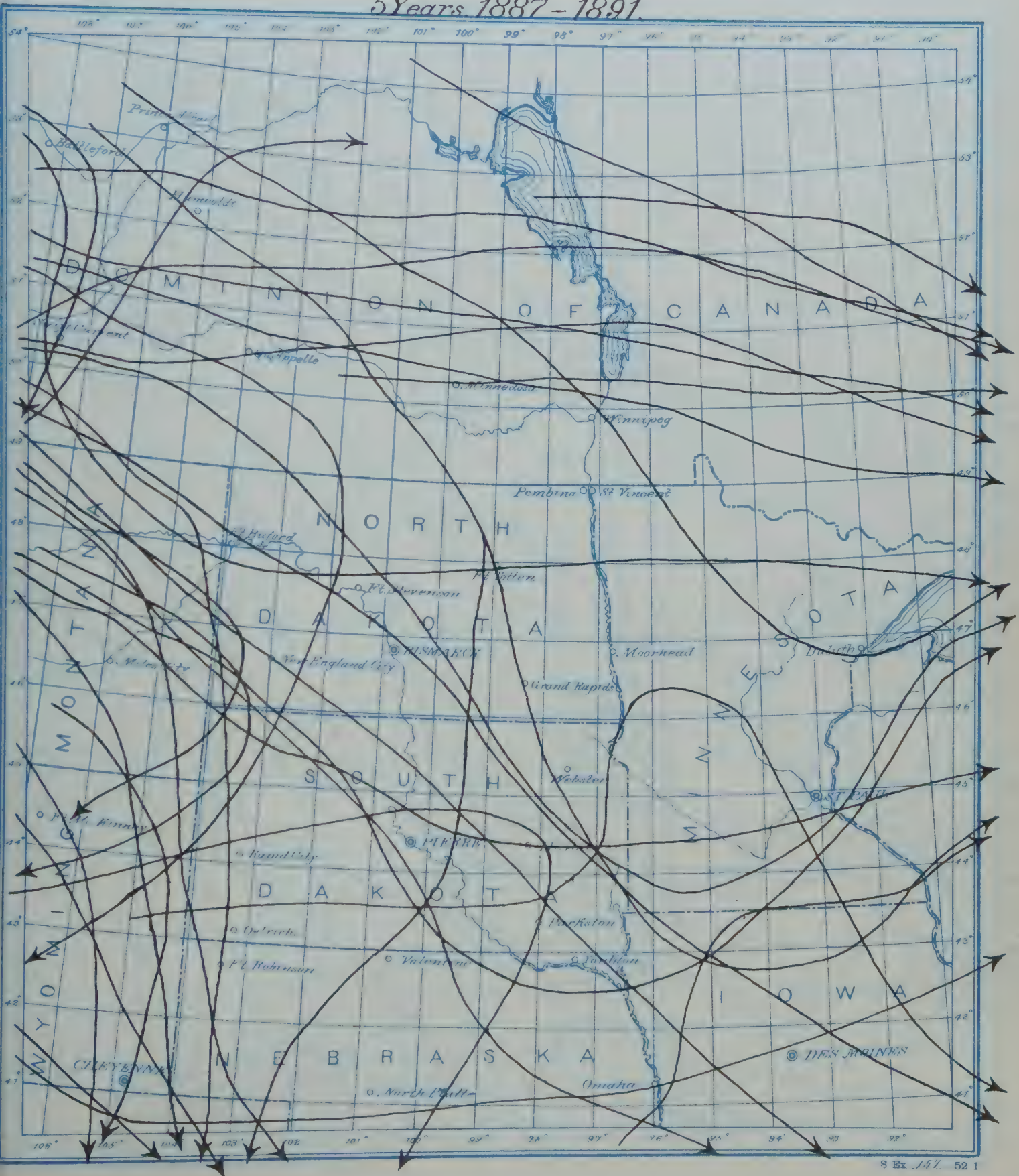


5 Years 1887-1891.



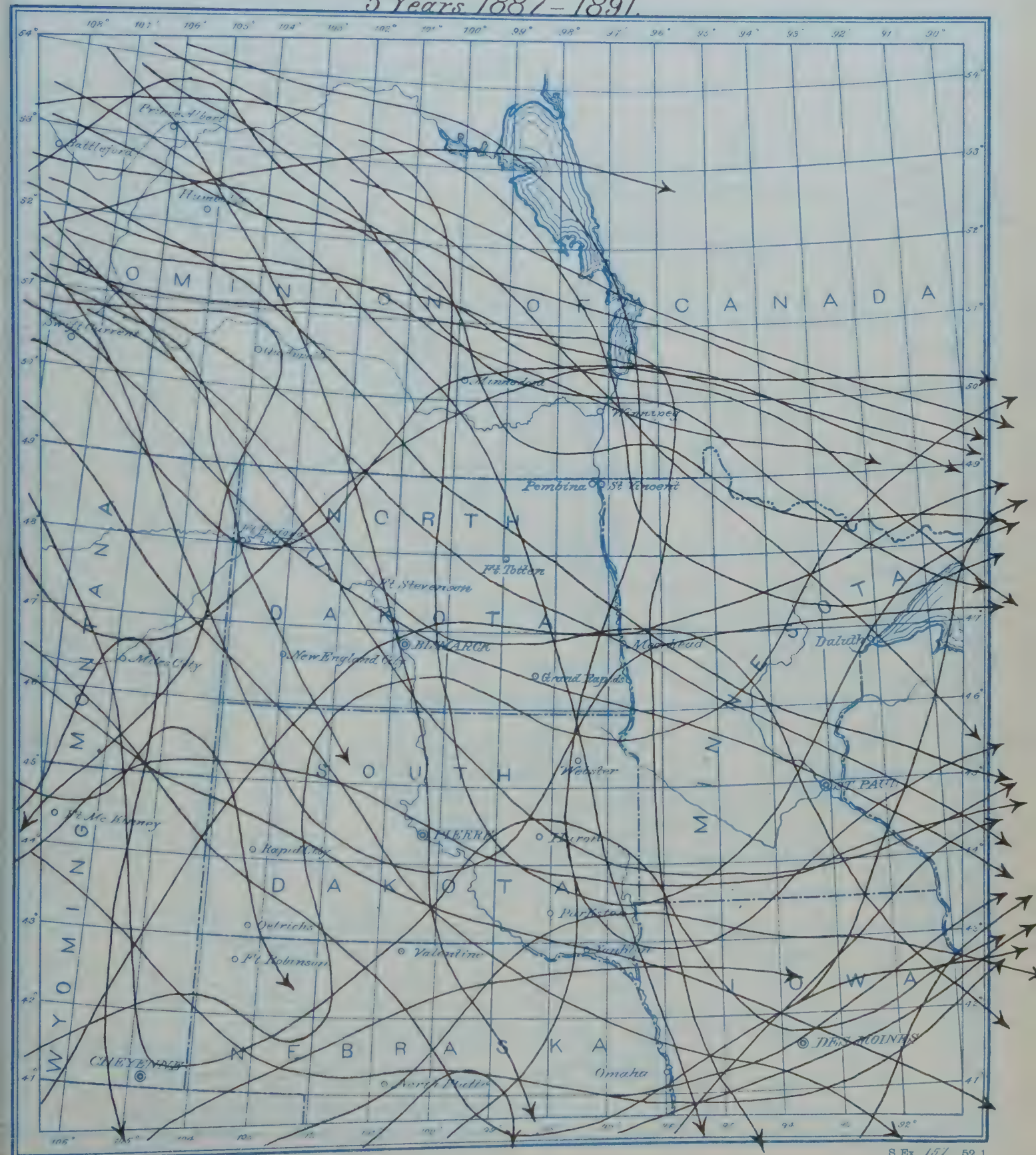
Appendix N^o 149.
 Tracks of Areas of Low Pressure. (Storm Centers.)
 March.

5 Years, 1887-1891.



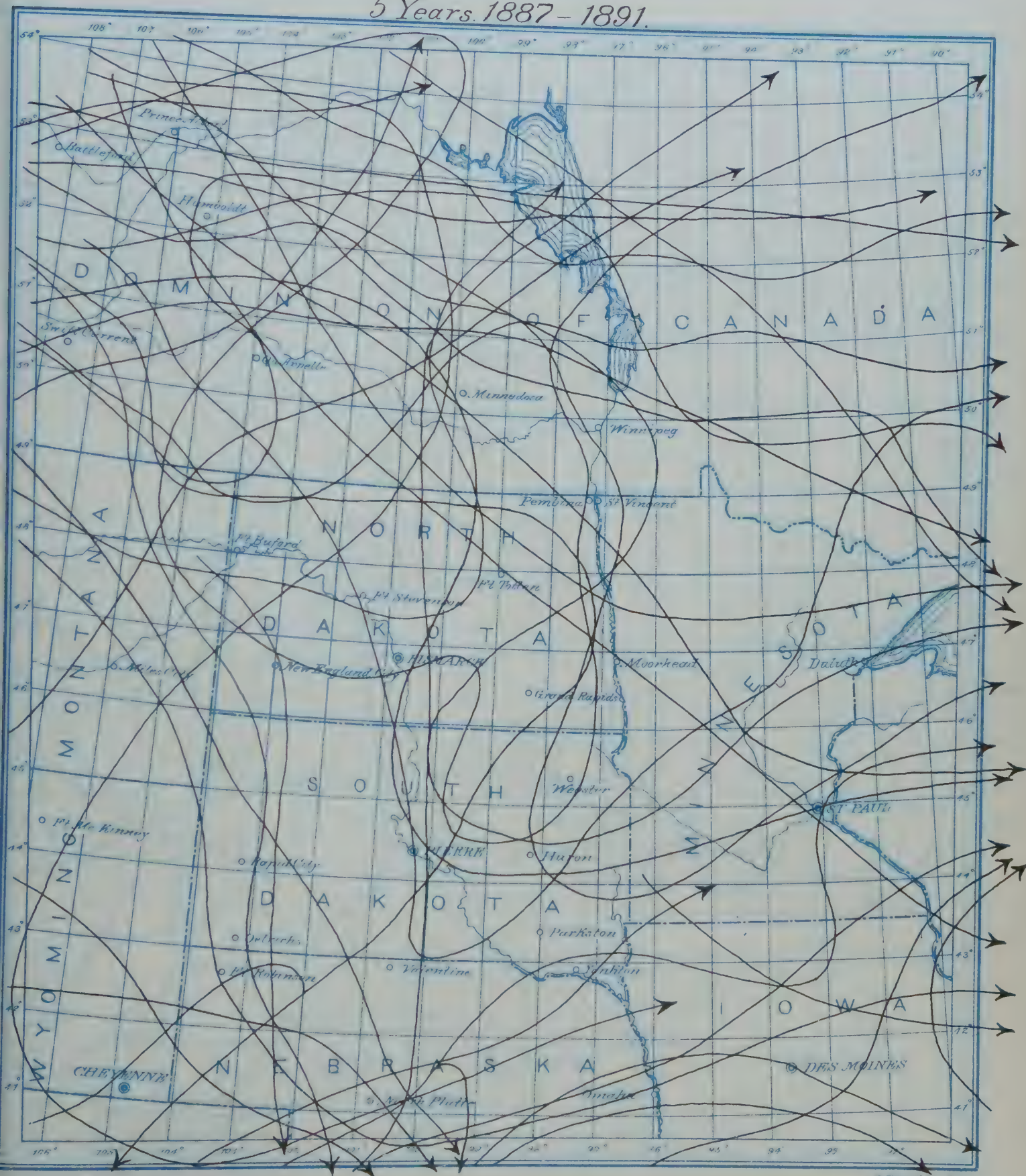
Appendix N^o 150.
 Tracks of Areas of Low Pressure. (Storm Centers.)
 April.

5 Years 1887-1891.

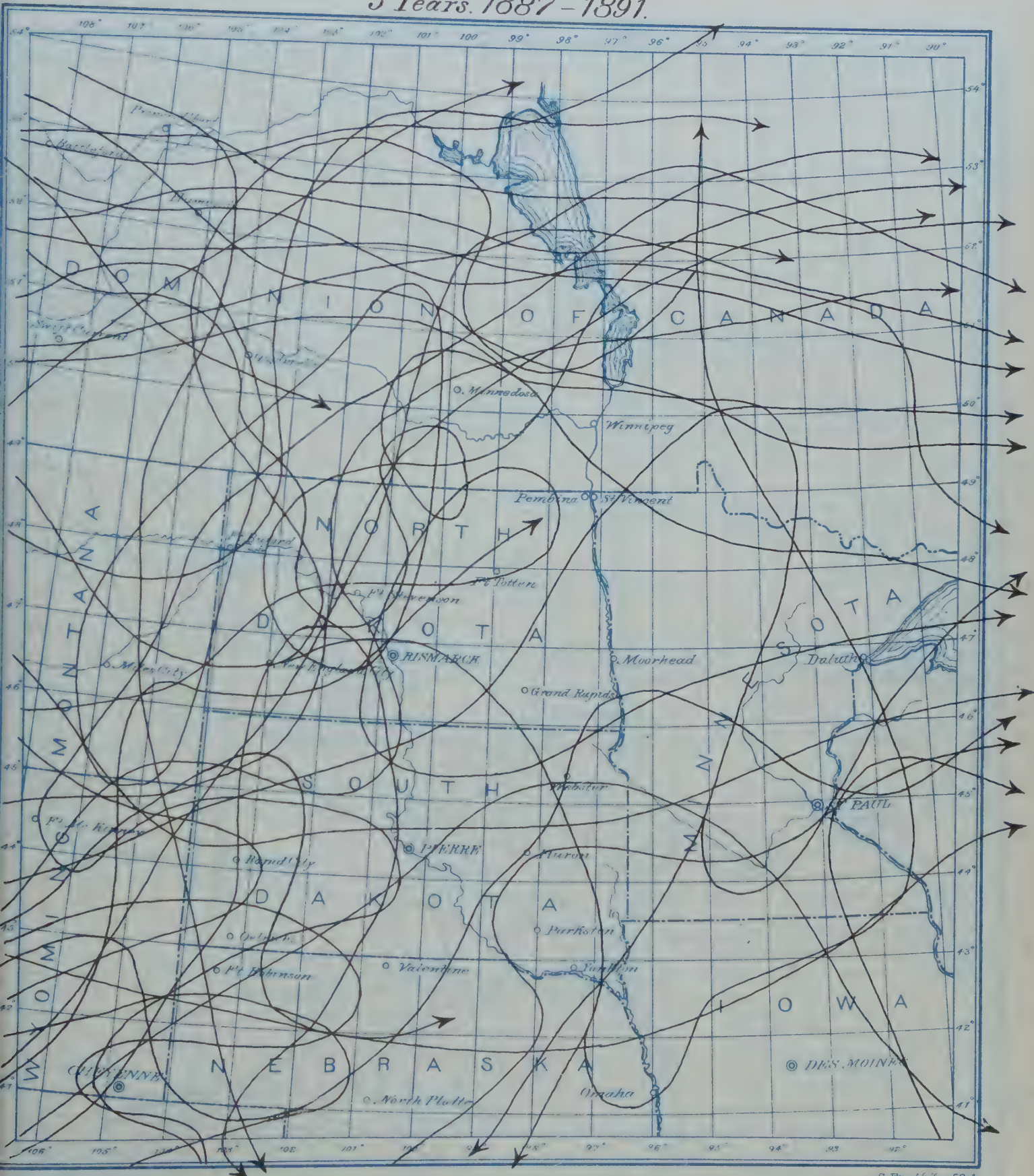


Appendix No. 151.
Tracks of Areas of Low Pressure. (Storm Centers.)
May.

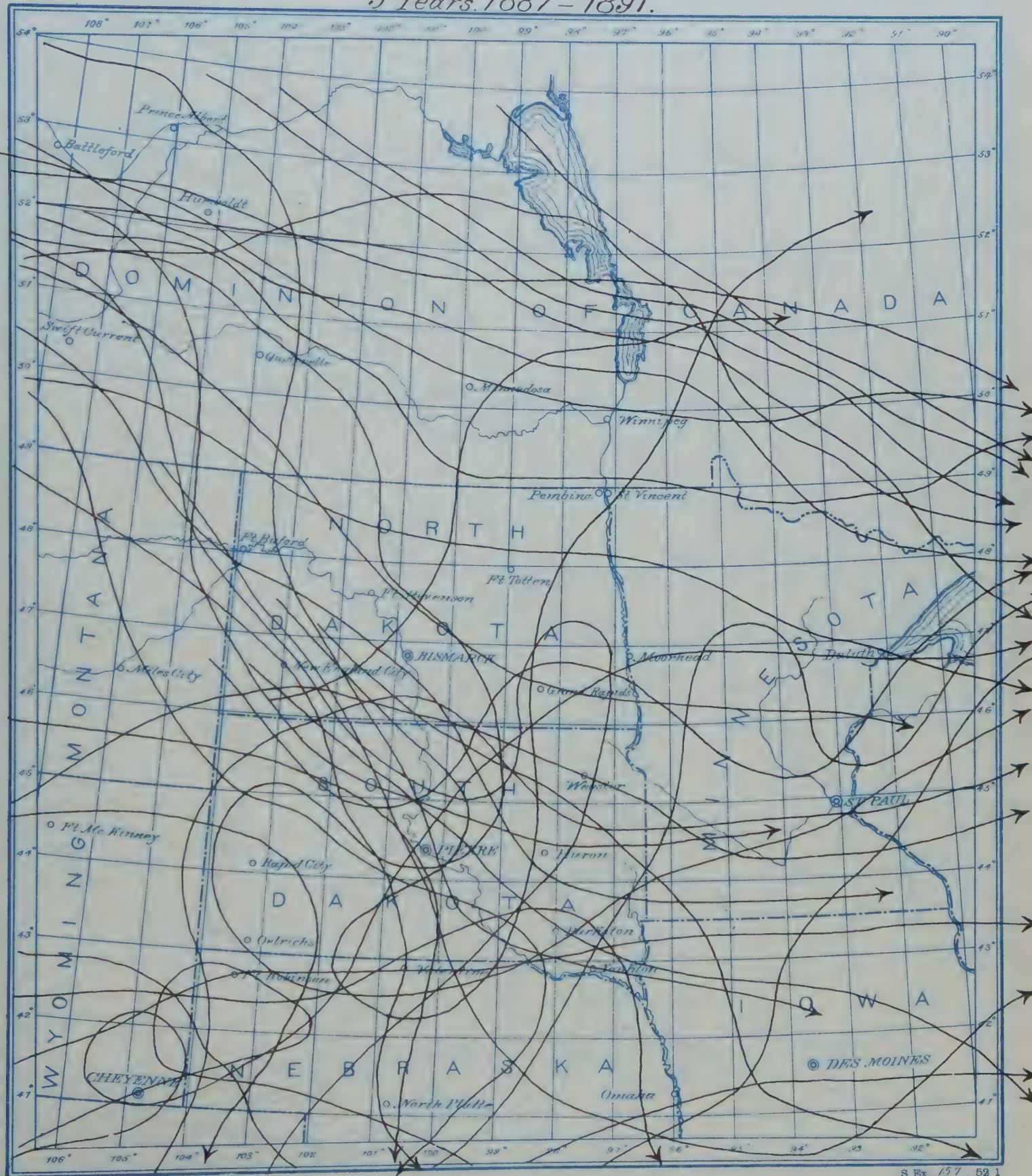
5 Years. 1887-1891.



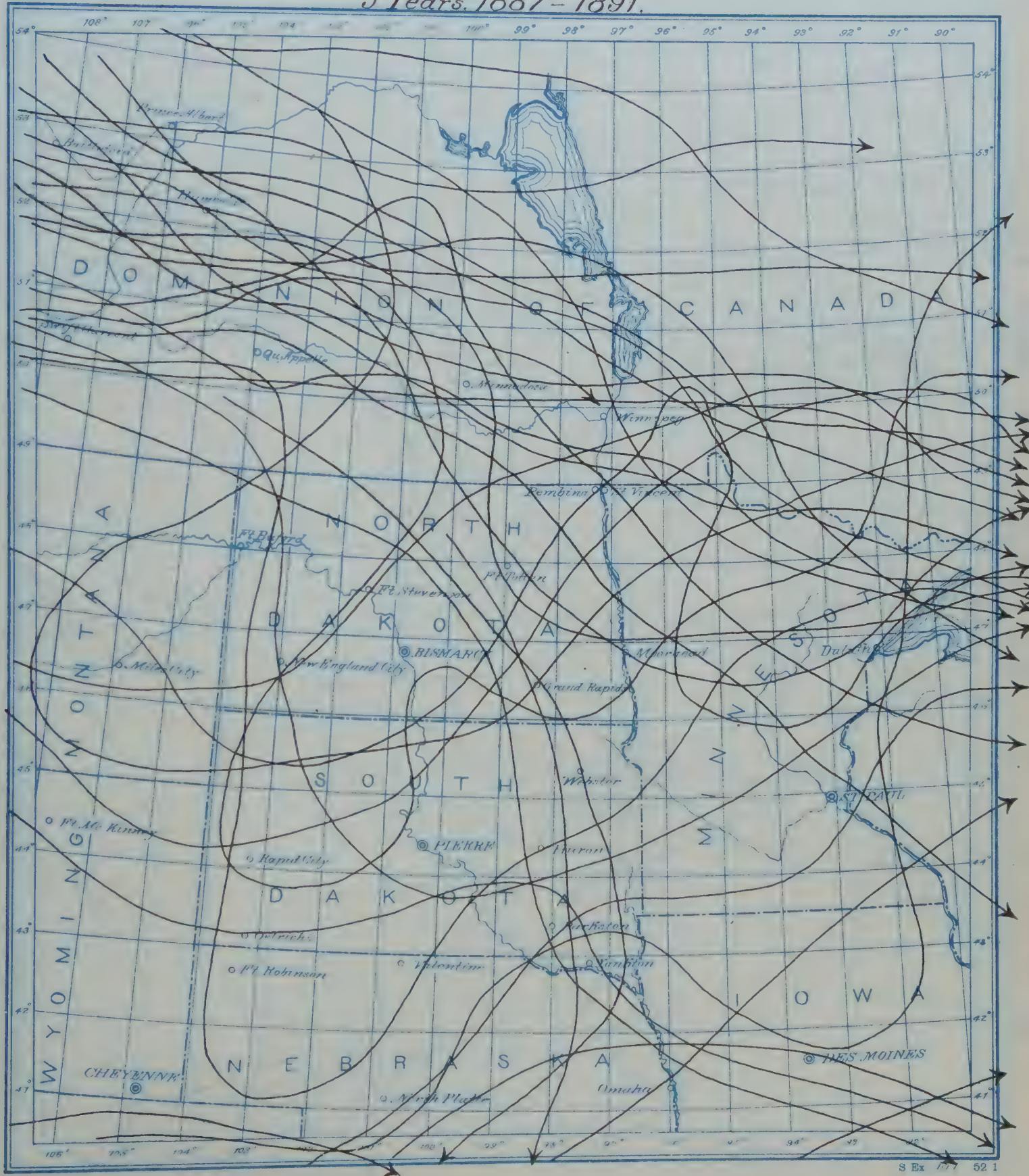
Appendix N^o 152.
Tracks of Areas of Low Pressure. (Storm Centers.)
June.
5 Years. 1887-1891.



Appendix N^o 153.
Tracks of Areas of Low Pressure. (Storm Centers.)
July.
5 Years. 1887-1891.



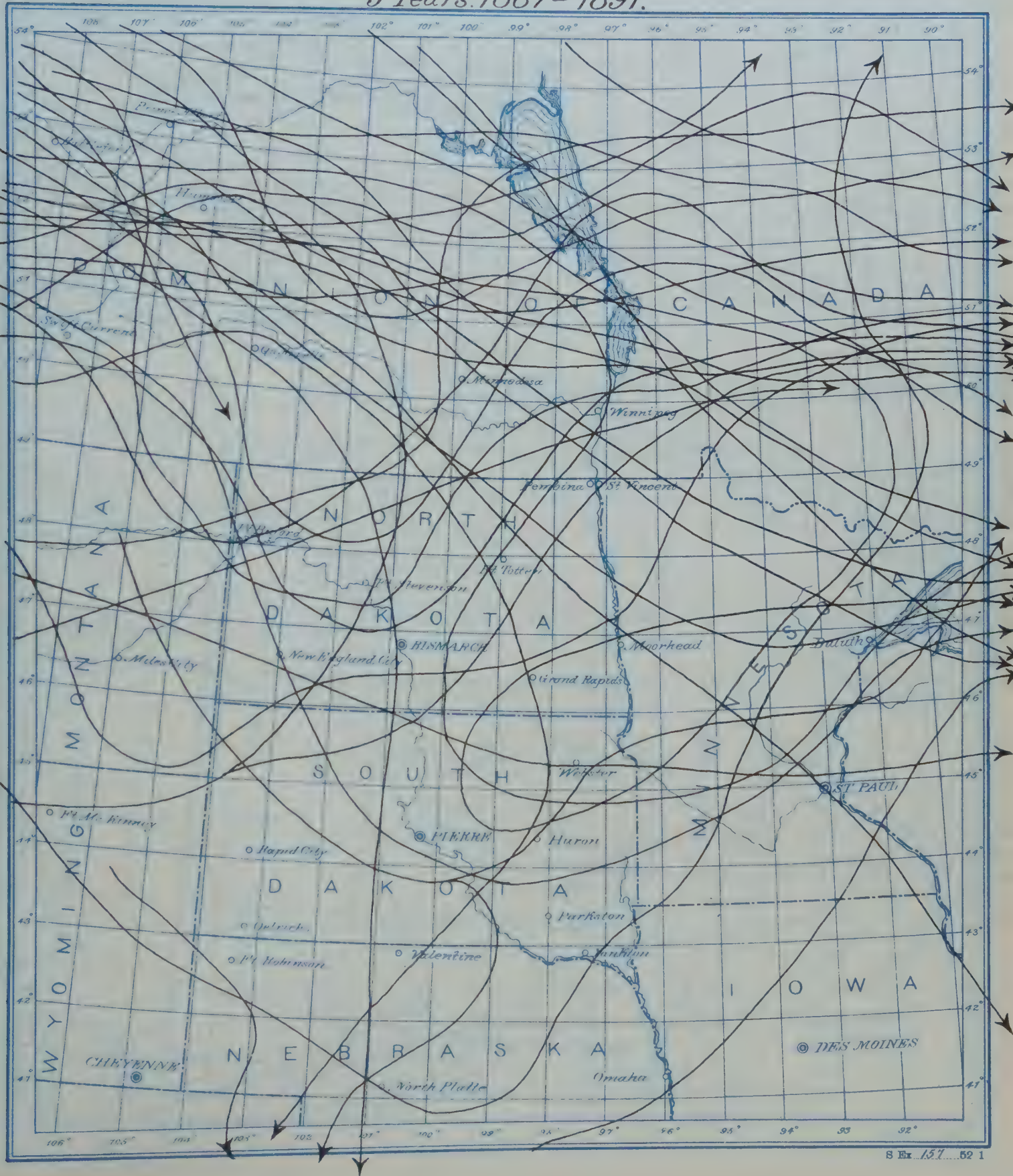
Appendix N: 154.
Tracks of Areas of Low Pressure. (Storm Centers.)
August.
5 Years. 1887-1891.



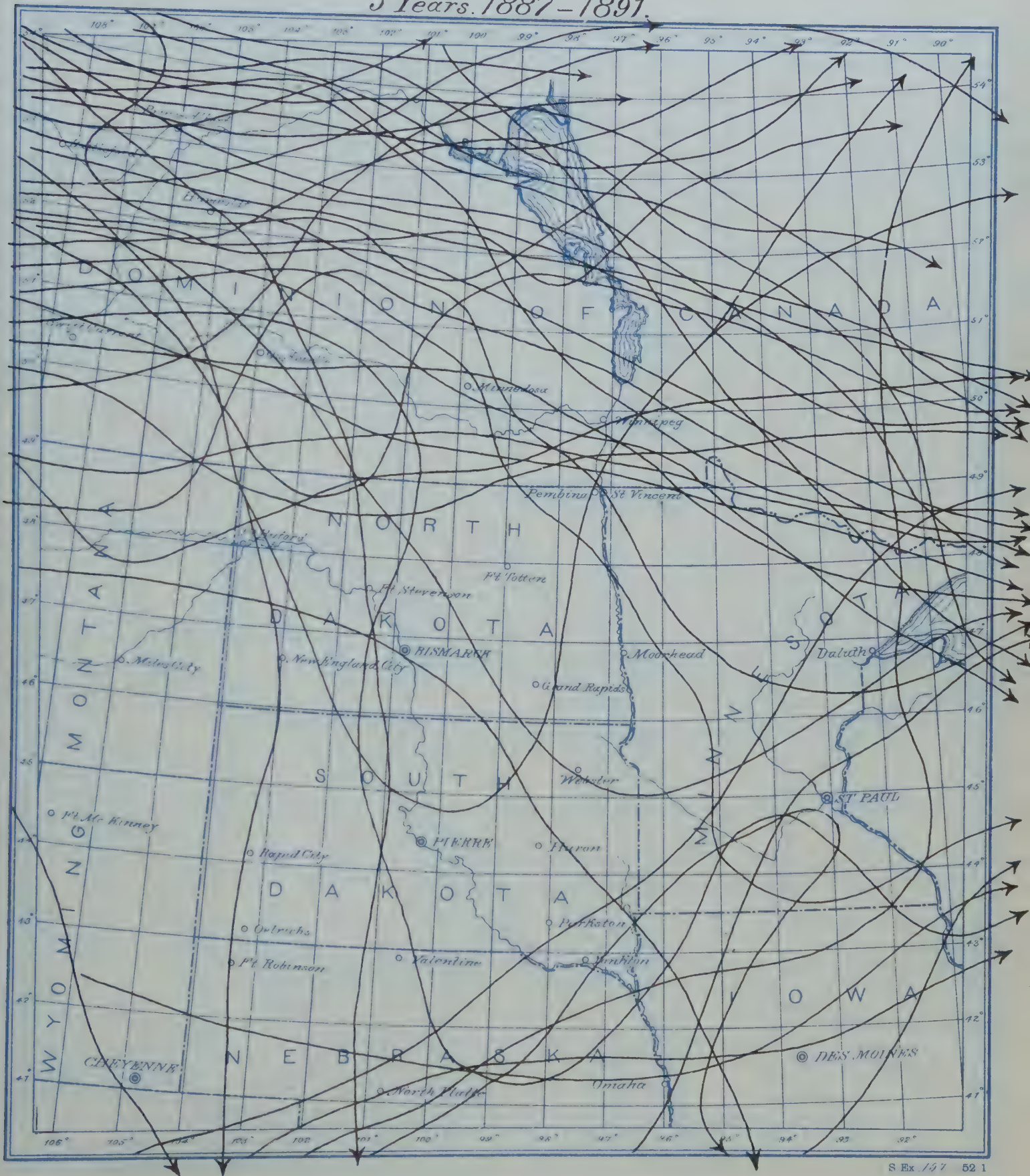
Appendix N: 155.

Tracks of Areas of Low Pressure. (Storm Centers.) September.

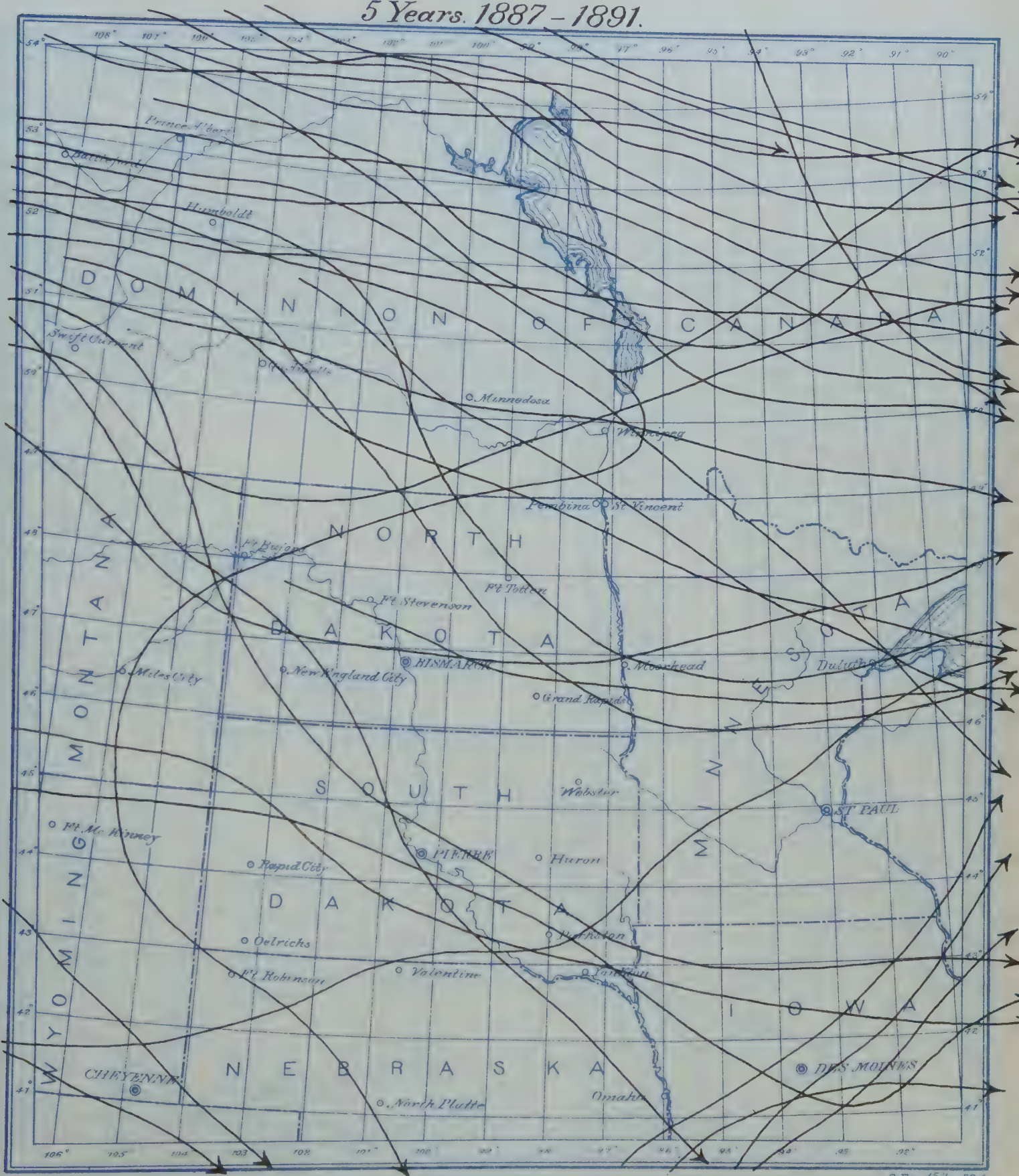
5 Years. 1887-1891.



Appendix N: 156.
Tracks of Areas of Low Pressure. (Storm Centers.)
October.
5 Years. 1887-1891.



Appendix N: 154.
Tracks of Areas of Low Pressure. (Storm Centers.)
November.
5 Years. 1887 - 1891.

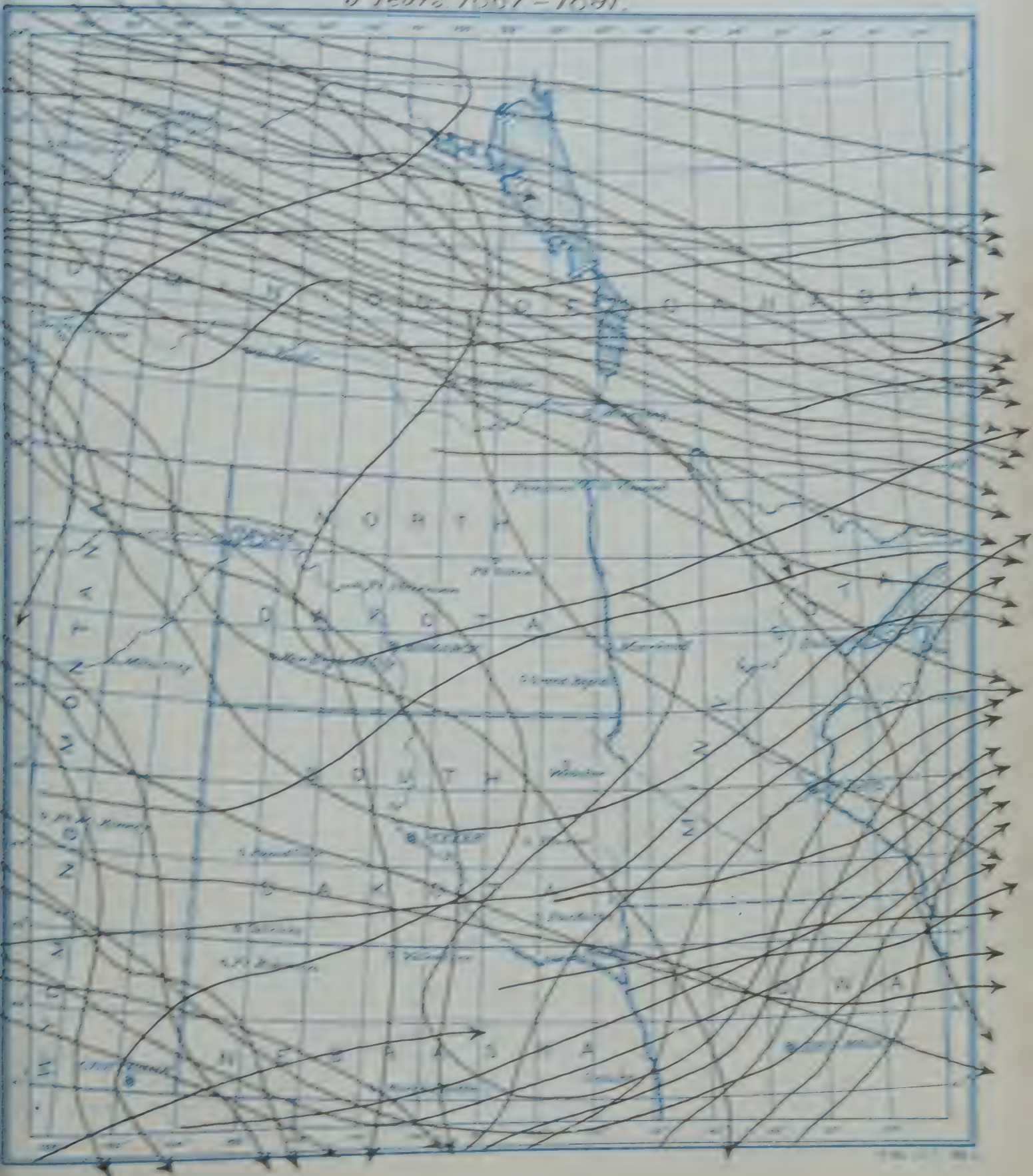


Appendix N: 158.

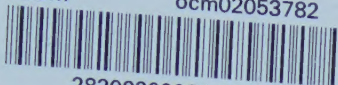
Tracks of Areas of Low Pressure. (Storm Centers.)

December.

5 Years, 1887-1891.



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Finley, John Park,
Certain climatic fe d diagrams
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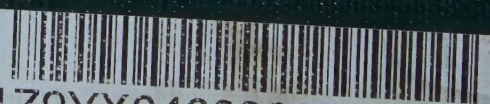
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Finley, John Park, 1854-
Certain climatic features
of the two Dakotas

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